DOCUMENT RESUME

ED 368 960 CE 066 353

AUTHOR	Redmann, Donna H., Ed.
TITLE	AERA Vocational Education Special Interest Group Proceedings. American Educational Research Association Annual Meeting (New Orleans, Louisiana, April 4-8, 1994).
PUB DATE	Apr 94
NOTE	470p.; For the 1993 conference proceedings, see ED 361 472.
PUB TYPE	Collected Works - Conference Proceedings (021)
EDRS PRICE	MF01/PC19 Plus Postage.
DESCRIPTORS	*Business Education; Career Development; Disabilities; Educational Improvement; Educational Policy; *Educational Trends; *Education Work Relationship; Higher Education; Mentors; Middle Schools; Outcomes of Education; Secondary Education; Teacher Education; *Teaching Methods; Technical Education; Technological Advancement; *Vocational Education; Vocational Education Teachers

ABSTRACT

This document contains 20 research papers on vocational education: "Multidimensional Evaluation of Long-Term Effects of Complex Teaching-Learning Arrangements--in the Context of Commercial Education" (Frank Achtenhagen); "Toward the New Vocationalism: Critical Perspectives on Education and Work" (Debra Bragg et al.); "Factors Influencing Learner Progress in Job-Training Programs" (Jill Sinclair Bell); "Student Outcomes Associated with the Integration of Academic and Vocational Education" (Curtis R. Finch, B. June Schmidt, and Susan L. Faulkner); "Attitudes toward Math and Science Courses and Problem-Solving Tasks among Socially-Oriented Secondary Vocational Students" (Robert L. Fritz); "Experiences of Average Students in Untracked High Schools: The Hidden Tech-Prep Population" (Kenneth C. Gray); "Vocationalism and the American High School: Past, Present, and Future" (Kenneth C. Gray); "What Are the Existing Articulation Procedures between Secondary and Postsecondary Agencies in North Carolina?" (Randy L. Joyner, Eugene V. Giovannini); "In Search of Vocational Teacher Education" (Richard L. Lynch); "Proprietary Vocational Schools' Role in Economic Development: Lessons from Indonesia" (Richard W. Moore); "Review of Youth Apprenticeship Legislation at the State Level" (Clifton L. Smith); "Basic Skills Important for Beginning Vocational Education Teachers: A Transportability Study" (Richard J. Tannenbaum, Michael Rosenfeld, and Charles J. Teryek); "Attitudes of Vocational Education Service Providers towards Disabled Persons with Implications for Developing Appropriate Learning Environments" (James W. Trott, Jr., Elwood F. Holton III, and Mark Holden); "Contributions of Vocational Education to Educational Reform as Perceived by Vocational Education Policy Influencers" (Larae Watkins); "Evaluation of Knowledge Structures by Procedures of Networking--in the Context of Commercial Education" (Susanne Weber); "The Impact of a Career Development Program on Middle School Students" (Carolyn R. Benz, Ron Kindell); "A Framework for the Subject Matter of Vocational Education: New Vision for Relating Education to Work and Family Life Responsibilities" (George H. Copa); "Mentoring: Is It a Factor in First-Year Teacher Adjustment" (Robert C. Harris); "Evaluation of California's Tech-Prep Education Program" (Michael Rubin); and "Preparing Tech Prep

Teachers: A Needs Assessment" (Tim L. Wentling, Chris A. Roegge, and Debra D. Bragg). (KC)

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AERA

VOCATIONAL EDUCATION SPECIAL INTEREST GROUP

PROCEEDINGS

American Educational Research Association

1994 Annual Meeting

New Orleans, Louisiana

April 4-8, 1994

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Donna H. Redmann
SIG Program Chair and Proceedings Editor
Louisiana State University

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NOTES FROM SIG PROGRAM CHAIR

The 1994 American Educational Research Association (AERA) Annual Meeting was held in New Orleans, Louisiana, April 4-8. The theme for the AERA conference was "Alternative Learning Environments: Work, School, Play." The AERA Vocational Education Special Interest Group (SIG) had six paper presentation sessions, a PBS session, and a business meeting. In response to the AERA program committee's suggestion for more experimental formats, the Vocational Education SIG scheduled a PBS format for one of its session. Chaired by Debra Bragg, this PBS session encouraged greater interaction. The business meeting featured Jackie L. Friederick, U.S. Department of Education. Her topic addressed new directions for research as it relates to the school-to-work legislation. A copy of the SIG program agenda is provided on page v. The 21 papers and the PBS format session presented were selected through a blind, peer refereed process. There were a total of ten reviewers, with each proposal being read by three reviewers. The 20 papers contained herein are from authors who wished to have their papers published in this Proceedings and also submitted them within the designated time frame.

Donna H. Redmann

Donna H. Redmann, Program Chair and Proceedings Editor
Vocational Education SIG
1994 AERA Annual Meeting

For further information, contact:

Donna H. Redmann, Ph.D.
School of Vocational Education
Louisiana State University
Baton Rouge, Louisiana 70803

(504) 388-5748

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Vocational Education SIG Program

1994 AERA Annual Meeting
New Orleans, Louisiana
April 4-8, 1994

Session Title: **Tech-Prep: Current Issues**
ID No.: S-109-6 -- Session No. 26.41

Date/Time: Wednesday, April 6, 10:35-12:05
Location: Sheraton, Felicity Room, 4th Floor

Chair/Discussant: Wanda Stitt-Gohdes, University of Georgia

Participants:

California's Tech-Prep Education Program: Initial Evaluation Findings and Common Research Challenges. Michael Rubin, Evaluation & Training Institute, San Francisco

Experiences of Average Students in Untracked High Schools: The Hidden Tech-Prep Population. Kenneth C. Gray, Pennsylvania State University

What Are the Existing Articulation Procedures Between Secondary and Postsecondary Agencies in North Carolina? Randy L. Joyner, East Carolina University; Eugene V. Giovannini, Indiana Vocational-Technical College

Student Outcomes Associated with the Integration of Academic and Vocational Education. Curtis R. Finch, B. June Schmidt, Susan L. Faulkner, NCRVE/VPI&SU

Session Title: **Program Outcomes--The Learner**
ID No.: S-109-5 -- Session No. 28.38

Date/Time: Wednesday, April 6, 12:25-1:55
Location: Sheraton, Gallier House Room, 4th Floor

Chair/Discussant: Hollie Thomas, Florida State University

Participants: The Impact of a Career Development Program on Middle School Students. Carolyn R. Benz, University of Dayton; Ron Kindell, Montgomery County Vocational Education Planning District, Ohio

Factors Influencing Learner Progress in Job Training Programs. Jill S. Bell, York University, Canada

Attitudes Toward Math and Science Courses and Problem-Solving Tasks Among Socially-Oriented Secondary Vocational Students. Robert L. Fritz, University of Georgia

Vocational Education From the Student's View. Shaunti Knauth, University of Chicago

Session Title: **A Global Perspective**
ID No.: S-109-7 -- Session No. 38.42

Date/Time: Thursday, April 7, 10:12:05
Location: Sheraton, Rampart Room, 5th Floor

Chair/Discussant: Jerry Kapes, Texas A&M University

Participants: A Framework for the Subject Matter of Vocational Education. George H. Copa, University of Minnesota

Multidimensional Evaluation of Long-Term Effects of Complex Teaching-Learning Arrangements -- in the Context of Commercial Education. Frank Achtenhagen, University of Goettingen, Germany

Evaluation of Knowledge Structures by Procedures of Networking -- in the Context of Commerical Education. Susanne Weber, University of Goettingen, Germany

Session Title: **Policy/Issues in Vocational Education**
ID No.: S-109-4 -- Session No. 40.35

Date/Time: Thursday, April 7, 12:25-1:55
Location: Sheraton, Ellendale Room, 4th Floor

Chair/Discussant: Curtis R. Finch, VPI & SU

Participants: Contributions of Vocational Education to Educational Reform as Perceived by Vocational Education Policy Influencers. Larae Watkins, Ohio State University

Review of Youth Apprenticeship Legislation at the State Level. Clifton L. Smith, University of Georgia

Attitudes of Vocational Education Service Providers Towards Disabled Persons with Implications for Developing Appropriate Learning Environments. James W. Trott, Jr., Elwood F. Holton III, Mark Holden, Louisiana State University

Can Private Alternatives Replace Public Postsecondary Vocational Education in Developing Nations? Lessons from Indonesia. Richard W. Moore, California State University at Northridge

Session Title: **Toward the New Vocationalism: Critical Perspectives on Education and Work (PBS Format)**
ID No.: S-109-2 -- Session No. 44.25

Date/Time: Thursday, April 7, 4:05-6:05
Location: Sheraton, Pontchartrain B Room, 3rd Floor

Chair/Participant: Debra D. Bragg, University of Illinois at Urbana-Champaign

Participants: Penny Burge, VPI&SU
Kenneth Gray, Pennsylvania State University
W. Norton Grubb, NCRVE at Berkeley
Richard D. Lakes, Georgia State University

Moderator: George H. Copa, University of Minnesota

Session Title: **Vocational Education--Into the Future.**
Vocational Education Research Membership Meeting

ID No.: S-109-1 -- Session No. 46.08

Date/Time: Thursday, April 7, 6:15-7:45
Location: Sheraton, Bayside A Room, 4th Floor

AVERA President: Larry E. Miller, Ohio State University

Program Chair: Donna H. Redmann, Louisiana State University

SIG Secretary: Randy L. Joyner, East Carolina University

Invited Speaker: New Directions for Research in the School-to-Work Legislation. Jackie L. Friederick, U. S. Department of Education, Office of Vocational and Adult Education, Washington, DC.

Session Title: **Issues in Vocational Teacher Preparation**
ID No.: S-109-3 -- Session No. 54.18

Date/Time: Friday, April 8, 2:15-3:45
Location: Marriott, Bacchus Room, 4th Floor

Chair/Discussant: Michael F. Burnett, Louisiana State University

Participants: In Search of Vocational Teacher Education. Richard L. Lynch, University of Georgia

Basic Skills Important for Beginning Vocational Education Teachers: A Transportability Study. Richard J. Tannenbaum, Michael Rosenfeld, Charles J. Teryek, ETS

Mentoring: Is It a Factor in First-Year Teacher Adjustment? Robert C. Harris, Indiana University

Preparing Tech Prep Teachers: A Needs Assessment. Tim L. Wentling, Chris A. Roegge, Debra D. Bragg, University of Illinois at Urbana-Champaign

PAPERS PRESENTED

Multidimensional Evaluation of Longterm-Effects of Complex Teaching-Learning Arrangements - in the Context of Commercial Education[1]

Prof. Dr.Dr.h.c. Frank Achtenhagen
Seminar für Wirtschaftspädagogik der
Georg-August-Universität Göttingen
Platz der Göttinger Sieben 5
D-37073 Göttingen
Telefon: 05 51/39 44 21-2
Telefax: 05 51/39 44 17
Bitnet: fachten@gwdg.de

Paper presented at the
Annual Meeting of the American Educational Research Association,
New Orleans, April 4th - 9th, 1994

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[1] The Projekt was partially granted by the Deutsche Forschungsgemeinschaft (Ac 35/6-1) and the Federal Ministry for Science and the Lower Saxonian Ministries for Science and Education.

1. Defining the actual problem of vocational education: Challenges in life and in the worksite - interpreted as "megatrends"

The actual discussion of problems of the labor market - and consequently of vocational education and training as preparation for it - is stamped by the experience of different challenges. These challenges influence independently or in combination the shape of jobs and labor organization. The new dimension of this impact is given by the fact that nearly all industrialized countries are confronted by them in a comparable way and that consequences cannot be drawn easily by some slight modifications of given structures. For this reason, BUTTLER 1992 proposed the term "megatrends" to characterize these challenges.

The main research problem at the moment is that these "megatrends" on the whole are not described and explained in a theoretically sufficient way. Therefore, causes and consequences cannot be stringently related to each other. For that reason, these "megatrends" have to be discussed in a more fragmentary way even though a strong evidence is given that they influence the labor market in the same direction (cf. for Germany: DEUTSCHE FORSCHUNGSGEMEINSCHAFT 1990; for Austria: BEIRAT FÜR WIRTSCHAFTS- UND SOZIALFRAGEN 1989; for England: SENGE 1990; HARRISON 1992; for USA: COPA 1992). **Figure 1** gives an idealtypical overview on the trends and consequences found on the labor market. Trends and consequences can be shortly described as follows, whereby exogenous trends might strengthen the effects of the endogenous ones:

Demographic reasons

A shortage of workers and clerks can and will be observed in Germany, but also in other European countries: We have cuts in the pyramids of population (as results of the wars and of birth control techniques); the differentiation of the whole school system causes larger differences of grades and of age and by that - together with an increasing mix of nationalities - larger differences of prior knowledge when entering the vocational educational system. This leads to a decreasing demand for lower and middle labour positions which - in sum - forms a lack of skilled workers and clerks and causes a limitation of economic growth (cf. DEUTSCHE FORSCHUNGSGEMEINSCHAFT 1990).

Individualization of value patterns

Recent research has shown that we can observe a great change of values and attitudes. This coincides with a loss of belief in authority in private, economic, and political life. There are also processes of stimulation overflow or of fear of ecological disaster. Prosperity-influenced behavior on the side of the youth competes with attitudes of the older generation. The disposition of time gains a growing importance (ef. SEMBILL 1992; AUTORENGRUPPE SCHULVERSUCH ALLGEMEINBILDUNG ZÜRICH 1991).

Growing internationalization of economy

This phenomenon urges new efforts with respect to new dimensions of competition within Europe and worldwide.

Increasing number of research results and their transformation into technologies

The use of such results changes production and labor structures.

Increasing use of new information and communication technology

This causes changes in many workplaces and calls for intensive adaptation to the new conditions. Micro electronics lead to an automatization of routine work and also to new possibilities of a controlled decentralization of job structures (cf. BUTTLER 1992; STOOSS/TROLL 1988 treated this phenomenon by describing the media used at the individual workplaces). Vintage effects of knowledge infiltrate the working processes: Traditional school and apprenticeship do not adequately prepare for the handling of the new technologies.

Worldwide use of resources and of environmental conditions

The continuity of worldwide growth and internationalization of economy urges probably a reduction of the use of non-recycable resources on the one side and more consciousness with regard to the reduction of pollution on the other (ef. BUTTLER 1992; BUNDESINSTITUT FÜR BERUFSBILDUNG 1993; ALBACH 1993; GILGEN/BIERI/BISCHOFF/GRESCH/ZÜRCHER 1993).

These trends lead to consequences for the organization of labor:

Possibilities of a systemic rationalization

By this strategy new forms of organization are fostered which bring together isolated goals and tasks of different branches and divisions of large enterprises (BAETHGE/OBERBECK 1986). One example: Until now an insurance company had different branches: car insurance, life insurance, home insurance, and so on. And the clerks had mainly to control how the money rolls in; and in the case of car insurance they had to decide by fixed rules whether an accident should be treated in a "normal" way or not. But now the client is treated in a "holistic" sense: Is there a lack of insurance? Does the life insurance fit to the other branches of insurance? Does the client maybe need additional insurance? And so on. All this provokes an extension of the view on the client. And the training of that view urges continuing education and a change of the corresponding apprenticeship for the clerks.

Slimming down the hierarchical system

Together with processes of a systemic rationalization, actual management theory fosters a shrinking of the hierarchical system in enterprises; the slogan is "lean production" (cf. WOMACK/JONES/ROCS 1991; DAUM/PIEPEL 1992; as critique: WILLIAMS/HASLAM 1992; BLOECH/BOGASCHEWSKI/GÖTZE/ROLAND 1993). This leads to enriched workplaces at which more decisions both independently and consciously must be made both in technical and in commercial divisions.

Increase of the "tertiary" domain

The "tertiary" domain is understood as the domain of services (in a general sense) and at the moment discussed unter three aspects (cf. BUTTLER 1992, p. 165 ff.; TESSARING 1993):

(a) We find a growth of the tertiary sector of the labor market at the cost of the agricultural and the production sectors.

(b) Within all sectors of the labor market, we find an increase of "tertiary" jobs, e.g. advising farmers with regard to commercial issues.

(c) Within a lot of jobs, there is an increasing part of "tertiary" activities, e.g. independent and responsible descisions on planning the next working steps etc.

Newer prognoses for Germany say that in the year 2010 about two thirds of all employees shall work in the tertiary sector. If one regards the whole "tertiary" domain as shown above, the estimation for 2010 grows up to 72%. These figures take into account the mutual dependency of the production and service sectors. The estimations also say that there will be a differentiated development of the different "tertiary" areas.

2. Possible consequences for the field of vocational and professional education and training

These "megatrends" which changed and probably will continue changing the labor structure cause heavy influence in the field of vocational and professional education and training. As these trends are developing relatively independently, it is hard to bundle up the consequences in a stringent way. At the moment, we only have got the possibility to stress certain lines and points of the actual development found in enterprises and administration. As these consequences are discussed on different levels on argumentation and with regard to different areas of practice (cf. DEUTSCHE FORSCHUNGSGEMEINSCHAFT 1990), they only can be presented here as listing (see also all texts of the BIBB-2 Fachkongreß vom 9.-11.12.1993 in Berlin):

(a) The term "megatrends" suggests that the challenges in life and in the worksite change radically the conditions and prerequisites of vocational and professional education.

(b) These challenges are new in the sense that - caused by their structure and consequences - traditional procedures of organization, of teaching and learning do not work effectively in the intended direction. DÖRNER 1989 speaks of a "logic of failure". By this term is meant that our thinking and acting mainly follow linear structures and ignore that the "megatrends" provoke new goals and tasks which are more complex - compared to the traditional structures - in the following sense:

- They cover a richer content;
- a large number of variables with different degrees of transparency is embedded
- which form a network, and
- vary over the time (also non-linearly), and
- are polytelic (the problem of main- and side-effects of decisions which have to be made with regard to the tasks and problems).

(c) These facts lead most Western industrialized countries to considerations on how to foster, or to restructure or to renew the whole educational system. As the field of vocational and professional education on the one hand marks the bridge between the general educational system and the occupational system and coincides on the other hand with a critical age in the lives of young people, very much emphasis is given to the discussions of this field.

This enterprise-related and person-related increased complexity calls for new forms of treating employees - not only as adaptation, but also as accomodation: The development of personality has been becoming a major goal of leading enterprises. The German research report, therefore, stressed the maxim of the "coincidence of economic and pedagogical reason". Formulated in another way: Research on vocational and professional education has to react to these challenges: Young people must be prepared actively and consciously to fulfil the tasks at the worksite; but education must also develop and stabilize the personality. Research, therefore, has to describe and explain thoroughly the tasks and problems and to analyze and to construct teaching-learning processes within adequate environments in a new way.

(d) These new efforts are confronted with problems on the side of policy: With regard to the non-ignorable "megatrends", politicians in all countries and also in the centre of the European Community tend to solve these threatening problems with hasty decisions on the vocational educational system. Simple harmonizing strategies or the "European vocational passport" might here serve as examples. These trials of political decisions can be interpreted as processes of solving ill-structured problems by inadequate measures. The main problem is that politicians and bureaucrats ignore the quality of the new problems and, therefore, only consider main effects and do not sufficiently think of possible and probable side-effects which very often are counterproductive with regard to the intended main-effect. Such behavior illustrates DÖRNER'S thesis of the "logic of failure" (cf. also DÖRNER/KREUZIG/ REITHER/STÄUDEL 1983).

(e) One grave example of this behavior is the fact that with regard to the field of vocational and professional education, the politicians and bureaucrats of all countries mainly think in institutional and organizational categories. They try to gain their ends - which very often are inadequately defined - by changes of institutions and of tracks through the educational system. They are not used to thinking in person-related, content-related, goal-related and process-related categories or - globally - in pedagogical dimensions.

(f) I am convinced that it is necessary to foster a way of thinking which **starts** with pedagogical categories and **ends** with institutional consequences - or better: alternatives. We have to make politicians and bureaucrats aware of these patterns of argumentation. To do this effectively, we need extensive research.

Judging the body of research results in the field of vocational and professional education, one gets ambiguous impressions: On the one hand, there has been - especially in recent years - an increasing number of research projects. But the whole range of these projects, on the other hand, has many gaps; three of them, in particular, should be mentioned:

- The research has been run within different scientific disciplines, e.g. education, psychology, sociology, business administration, and within these disciplines by differentiated subdisciplines which do not communicate satisfactorily with each other.
- There is a lack of continuity in research.
- There is an overemphasis on institutional problems. So that, the political and bureaucratic bias is strengthened by research effort.

The disciplines involved in vocational and professional education, therefore, deliver at the moment mainly fragmentary and isolated results which cannot be easily combined or integrated in the form of broad and consistent theory.

In the following reflections I would like especially to discuss these problems with regard to research needs and to political decisions which are necessary. Although I try to formulate the problems in a general way, I will mainly use examples from the German system, and here especially from the commercial, administrative, and public services for two reasons: (1) About 62 % of all German employees work in this field (with an increasing tendency (s.a.)); (2) I specialize in this area of vocational education.

3. Process-orientation of research on vocational education

It is my conviction that the present and future problems of vocational and professional education which are caused by the "megatrends" can only be solved rationally and effectively if the research focus is on the process structure.

This conviction is based upon the critique of traditional (German) didactic models and theories (cf. the overview in BLANKERTZ 1975) which focus on descriptive categories of 45-minutes lessons and neglect the midterm and longterm perspective (see ACHTENHAGEN

1984, p. 191-220). Didactic approaches which try to consider developments in the field of cognitive psychology also foster a static perspective (cf. AEBII 1987). These problems correspond to the controversy on the product-process paradigm of research on teaching and learning. Although DUNKIN/BIDDLE 1974 stressed the process perspective, the mainstream of research followed product-oriented approaches (cf. SHULMAN 1986b; SHAVELSON/WEBB/BURSTEIN 1986; BROPHY/GOOD 1986). By that, researchers mainly work with selected and limited time-points, and overlook the fact that most of the results of classroom teaching and learning are influenced by continuous and long-term processes (cf. ACHTENHAGEN 1990c, p. 647). BIDDLE/DUNKIN 1987, p. 123, write with regard to problems of longitudinal research: "Most research on the effects of teaching presumes a stable teaching environment and that effects will appear quickly. But the real world of teaching is far from stable, and teaching may have effects that cumulate or are delayed". A very wield formulation is that of BROPHY 1979, p. 743: "Thus a study involving 20 classrooms studied for 20 hours each is almost certainly going to be more valuable then a study of a single classroom for 400 hours or a study of 400 classrooms for one hour each, other things being equal".

These conclusions are also valid for research questions in the field of vocational education. But - emphasizing the processes of teaching and learning does not mean only keeping track of traditional teaching and learning procedures. It is necessary to develop new forms of multidimensional teaching-learning arrangements and environments by which vocational instruction can be run over longer time periods. But this is consistent with the international trend: as examples: PIETERS/ BREUER/SIMONS 1990; CROOKALL/KLABBERS/COOTE/ SAUNDERS/CECCHINI/ DELLE PIANE 1988; KLABBERS/SCHEPER/TAKKENBERG/ CROOKALL 1989.

There are different reasons for stressing the development, the implementation, and the dissemination of multidimensional teaching-learning arrangements and environments:

(a) A pragmatic reason: the complexity of such approaches (as computer-based simulation games, case studies, simulated offices, working-analogue learning tasks etc.) makes it possible to react to more than only one consequences caused by the "megatrends".

(b) Scientific reasons: it is possible to relate these multidimensional teaching-learning arrangements and environments by at least three different ways to scientific approaches:

- By these arrangements it is possible to model the instructional design with regard to the network structure which is run within the systems approach of business theory (cf. GOMEZ/PROBST 1987).
- It is also possible to consider research in the field of cognitive psychology which emphasizes networking with regard to theories of learning and retrieving information (as one example cf. NOVAK 1985).
- New didactic proposals can be considered to overcome the dualism of thinking and acting (cf. AEBLI 1980, 1981).

Summarizing, we can say that these arrangements offer an excellent way to leave the linear structure of traditional teaching and learning and fit vocational education to the complex network-like structure of the new requirements at the workplaces. Different evaluative approaches show that adequately constructed and run arrangements do have positive effects (some examples will be shown later on in this text). This mixture of theoretical evidence and first substantial evaluation results should lead to promote this approach of complex, multidimendional teaching-learning arrangements and environments.

4. Some aspects of necessary research strategies

Discussing the development and the research on multidimensional teaching-learning arrangements, one has to be aware that at the moment neither vocational schools nor enterprises are prepared to adequately fit their procedures and arrangements to these new challenges in the worksite and in real life. Two reasons have to be mentioned: (a) the very traditional content structure, (b) the missing flexibility of teacher and trainer behavior.

ad (a): The very traditional content structure

Different aspects of the content problem are easily distinguishable (cf. ACHTENHAGEN, 1992a). There are several - in part overlapping - that are relevant to the discussion here:

(1) At a primary level, content is what defines the central relation between vocational education and work. Teaching-learning processes in schools and enterprises are mainly held for content purposes - a fact which is emphasized by curriculum theory but often underestimated by teaching-learning research. How this connection is defined for different professions depends usually, but not necessarily, upon the particular science and teacher education.

(2) Content appears at different stages and in different modes of representation. For example, it can appear as a natural setting, as a medium, as a book, or as an oral statement by teachers and trainers.

(3) There are different stages of transformation of content. SHULMAN 1986a, p. 9, defined three categories of content knowledge: (a) Subject matter content knowledge; (b) pedagogical content knowledge, and (c) curricular knowledge. This concept has been extended by other publications (SHULMAN, 1986b; WILSON/SHULMAN/RICHERT 1987, p. 113) - and also criticized (MCEWAN/BULL 1991). In any case the distinctions are useful: "Knowledge" is regarded as the "subjective" aspect of subject matter and "content" as the "objective." This allows us to make these categories more explicit. We have:

- content per se (represented by situations);
- content in its diverse disciplinary structures;
- content as represented by media (including the author's goal system);
- content as part of the knowledge of the individual teacher or trainer;
- content as part of the prior knowledge of the individual student or apprentice and as goal of the teaching-learning process;

- content as part of the examination system;
- content as part of the cognitive structure of examiners; and finally
- content as part of the cognitive structure of employers, agents of trade unions and the public.

There is no integrative structure for these points. They can be incompatible - a fact which depends upon the differing interpretation of content. We ran e.g. studies on the prior knowledge of students when entering commercial schools and its change by the formal instructional processes as part of vocational education. The results show that the differences between the students in understanding the underlying context concepts cause a lot of teaching and learning problems. WEBER 1993 and 1994 measured these effects by a networking method combined with a zooming-in technique where the students had to define central economic concepts. She could demonstrate that the understanding of context units varied not only on the intraclass level but also on the interclass level, especially when different teachers taught the classes.

These results can be related to research problems, especially the underestimation of content within teaching-learning research (as mentioned above): "It ist remarkable that, of all categories of analysis, the data for the substantive meanings covered in the classroom reveal the greatest variability among the teachers" (BELLACK/KLIEBARD/HYMAN/SMITH, Jr. 1966, p. 63,68). This phenomenon was also found in other contexts: DAHLLÖF 1972, p. 174, concludes with regard to Swedish studies that the validity in relation to the specific instructional content was of little value. SHAVELSON/WEBB/BURSTEIN 1986, p.53, emphasize (with respect to an unpublished paper of GOOD) that "broader issues of **what is taught** and **how appropriately** have been largely ignored". BROPHY/GOOD 1986, p. 369, say that "researchers need to pay more specific attention ... to the scope and sequence of the curriculum and to the specific subject matter goals and content taught in particular lessons". The most pregnant formulations are used by SHULMAN 1986a, p. 6: "Investigators ignored one central aspect of classroom life: the subject matter"; "the absence of focus on subject matter among the various research paradigms for the study of teaching" is characterized as "the 'missing paradigm' problem"; "the importance of content has been forgotten". The resurrection of interest in content (cf. BARR 1987) surely deals with the cognitive turning-point in psychology although newer approaches in the field of complex problem solving failed their tasks by the neglect of content. DÖRNER, for example, constructed a microworld LOHHAUSEN where a mayor had to run the affairs of an artificial town over a certain period (DÖRNER/KREUZIG/REITHER/STAEUDEL 1983). The research group investigated the behavior of the person who overtook the mayor's role and tried to identify good and bad problem solvers. There were many problems with the interpretation of results and their correlation with measures of intelligence and so on. This was caused by the fact that the researchers did not realize that three different types of content had been embedded into the project: the content modelled by the researchers; the content in the interpretation of the experimenters; and the content in the interpretation of the problem solvers. According to my judgment of that study - and others in the field of problem-solving -, these three different aspects of content - which were not controlled by the researchers - caused the interpretation problems (ACHTENHAGEN, 1990b). To avoid such problems, psychologically-driven teaching-learning research has tended to choose physics and mathematics as the main content area. But research on the expert-novice paradigm shows that the "content" of physics also varies: Confronted with the same problems, experts observe, interpret, and handle content structures in other ways than novices do (cf. CHI/FELTOVICH/GLASER, 1981). Similar statements can be made in the field of mathematics.

These analytic views surely have influenced the fact that the content dimension gains increasing attention within classroom related research (cf. ACHTENHAGEN 1992a): STODOLSKY 1988 pointed out the importance of the variable content matter for instructional practice. SHULMAN has been leading a group "Knowledge Growth in a Profession" (cf. GUDMUNDSDOTTIR 1991). There are also several trials to describe content in a more general non-subjectspecific way (cf. KLAUER 1976; SCHOTT 1976) or more subject-related (cf. ACHTENHAGEN/WIENOLD 1975; ACHTENHAGEN 1990c). If we do not follow the way of thoroughly describing the content structure underlying the teaching-learning processes within vocational education we fail to become effective.

To summarize: What is understood as "content" correlates with the degree of expertise in the specific field. "Content" is not equal to "content"; it is defined by highly individualized and specified understanding of that specific content and its structure and, therefore, has to be defined with regard to specific situations with all their syntactic, semantic, and pragmatic components.

(4) A last dimension that I would like to mention here is related to the connection between educational goals and content (the main point of German didactic models). Is there a possibility of discussing content in a neutral way? Or does content change in relation to specific goals, questions, and perspectives? To give a small example: Does the same nuclear power plant (the content) stand for problems of generating electricity or for a certain risk to the neighbourhood? Here is where the interrelationship between pedagogical effectiveness and responsibility rules, and necessarily has to rule, the structure of didactic argumentation and action. It is also here that morality, ecology, ethics enter the didactic discourse for vocational education.

With regard to the actual needs of enterprises and real life - caused by the very new challenges - the actual content structure of vocational education should be discussed at least under the following aspects - where one remark is necessary: We collected the reported results from studies which were run within the last 20 years. All results show high stability. By the study of REBMANN 1993 we evaluated again learning material and found very similar structures.

(a) Content units (including the goals) are defined by situational aspects and thus should be operationalized on all possible levels. This requirement is currently not fulfilled. Different analyses show that according to BLOOM'S taxonomy of educational goals we have an overrepresentation of goals on the lowest cognitive level (KRUMM 1973, p.

85; ACHTENHAGEN 1984, p. 179): 97 % of items in classroom tests, 93 % of items in final examinations, and 85 % of items in textbooks fit in the category "knowledge". Only 11 % of the textbook items were related to the category "application".

(b) *Content units should be related to usability in industry and administration.* This requirement is also not currently fulfilled. Context analyses of curricula demonstrate that only 29 % of the curricular content for vocational full-time schools and only 45 % for vocational part-time schools are related to qualifications for vocational situations. The remainder is related to very general political and economic situations (KRUMM 1973, p. 43; ACHTENHAGEN 1984, p. 148). There is not one content unit dealing with students' situations as a seller-of-work. The practical needs of the worksite are neglected. It is also interesting to note that this analysis was done even before the impact of new technologies gained its present importance.

(c) *Content units are not concerned with the abilities of the students.* One of the main results of our analyses shows that the students and their needs and abilities do not really exist within the didactic literature. We analyzed teacher handbooks in the field of economic and commercial education and found that only 8 % of all sentences were related to the students, but without interrelationship to content and other instructional variables. About 44 % of these sentences were negatively formulated: the students and apprentices are described as relatively unintelligent, unmotivated, without discipline, and so on (ACHTENHAGEN 1984, pp. 25, 27). We found comparable results in the area of foreign language teaching (ACHTENHAGEN/WIENOLD 1975, Vol. 1, pp. 46, 51). Therefore, it seems to be very difficult to fit the new challenges to the teachers' and students' possibilities.

(d) *Content units should follow modern structures of life and not patterns of the "royal merchant" who stands on the barks and observes his entering fleet.* The structure of German textbooks for commercial schools has been laid in 1675 - according to SAVARY'S book "Le parfait négociant". The oldest textbook still in use in Göttingen has its origin in 1875 and is now in the 53rd edition. The mostly used textbook in Lower Saxony has its 187th edition.

(e) *Content units are linearized, chopped into pieces, distant from economic needs, distant from personal needs and abilities, and wrongly mixed (in other words there is an overrepresentation of traditional units such as law.)* The structure of curricula and the construction of textbooks corresponds to this fact (cf. REBMANN 1993). **Figure** 2 shows as example content and goals for the first 10 of 180 lessons of the curriculum for the school subject "Business Administration" in German Commercial Schools (NIEDERSÄCHSISCHER KULTUSMINISTER 1987).

The actual demand of enterprises (and also: of real life) cannot be satisfied by that content and curriculum structure. For management needs a personnel with explicitly given and trained abilities which are characterized as "key-qualifications" (cf. MERTENS 1974; REETZ/REITMANN 1990). Sucn qualifications are meant by the claims of network-oriented thinking, handling adequately complex problems, being able to work in teams and to cooperate, etc. (cf. BUTTLER 1992; TESSARING 1993; BAETHGE/OBERBECK

1986). Theoretically, these needs are stressed by the St. Gall systems approach of business theory (cf. ULRICH 1970; ULRICH/PROBST 1988).

But also the students and apprentices have problems with that linearized structure: The organization of the content units and the corresponding linear teaching procedures very often lead to patterns of rote learning; the mindfulness of the goals and content is kept hidden from the students.

ad (b): The missing flexibility of teacher and trainer behavior

Teachers, trainers and students are costumed to stay with these lists of goals and content units. Therefore, they are not able to effectively handle more complex teaching-learning problems which are proposed as alternatives. We find, consequently, a great gap between wonderful proposals of simulation games, case studies, simulated offices, projects, etc. and their actual use in the classroooms.

Another fact is that at a lot of faculties of economy simulation games and case studies are urged or run, but that these complex teaching-learning arrangements are not part of the compulsory lecture program. This is - for me - another strong argument for the thesis that teachers and students or apprentices do have problems with complex, multidimensional teaching-learning situations. We studied this phenomenon thoroughly over years (KAHLE/ACHTENHAGEN 1979; ACHTENHAGEN 1992b). Our starting point was that - when we ran the first time our simulation game and case study - we did not advise the teachers. We very soon had to notice that the test results of our experimental classes were not better than those of the control classes. By inspection of the videotapes of the discussion and decision finding processes of the simulation game groups we must registrate that the teachers did not foster, stimulate, summarize the group discussion processes, that there was a lack of critique and critical questions and remarks on the side of the teachers (cf. ACHTENHAGEN/TRAMM/PREISS/SEEMANN-WEYMAR/JOHN/SCHUNCK 1992; FÜRSTENAU 1994).

Another study showed that not only the cognitive domain but also the emotional and motivational were influenced by a non-expert teacher behavior. SCHUNCK 1993, p. 195, got the results that such a behavior does not have a positive influence on the learning processes, affects negatively the well-being and interest of the students, does not relate the questions of the students to the occupational reality, and provokes monotony.

The research-based development of new forms of effective teaching and learning has, therefore, to be especially aware of at least three crucial problems: (a) One has to think on a reform of teacher education and recurrent education with regard to the (necessary and adequate) use and handling of complex teaching-learning arrangements and environments (with regard to simulated offices cf. the recommendation in ACHTENHAGEN/SCHNEIDER 1993). This includes (b) that one has to think of the content dimensions of the whole curriculum and (c) that one has to think on the mid-term and long-term dimensions of the development of the students' personality and their higher order abilities (as problem-solving or "key-qualifications"). This point, especially, marks the bridge to a consideration of learning with regard to the new challenges. The exploration of the time perspective within the years of vocational education may give decisive hints for an effective lifelong learning which is more than refreshing of a knowledge of facts.

The research should be organized as a combination of curriculum research and teaching-learning research; by that, it is focussed on perspectives of time and action. This research leads to new complex teaching-learning arrangements, e.g. computer-based simulation games, case studies, working analogue learning tasks, learning environments etc. The construction of these arrangements should satisfy at least five criteria: (a) The goals and the content of each arrangement should be of importance for the worksite. (b) The goals and the content should correspond to modern scientific research for the specific field of practice. (c) The students and the apprentices should judge the goals and the content as subjectively important and mindful. (d) The goals and the content must be conceivable and understandable. (e) The teachers and trainers must accept the arrangement and its background-theories and they must be thoroughly trained to effectively handle it.

The important point for the development of vocational education is whether these arrangements and environments also can be run within the Dual System. We developed our approach in commercial school systems where fulltime classes ("Berufsfachschule") and also parttime classes ("Berufsschule") were taught. We tested our proposals firstly in fulltime classes and found that -as one partner of the Dual System - did not need more time for our complex teaching-learning arrangements in the experimental classes than in the control classes with "normal" instruction. The major reason was that we covered by our procedure more goals and content units - also of "later" parts of the curriculum. This experience led our teachers to tests of our arrangements also in parttime classes - with sufficiently positive results. This point was principly critical as - normally - the enterprises monitor the activities of the counterpart (here: the school) of the Dual System. We, therefore, are optimistic that we might change the whole 3-year curriculum of an apprentiship within the next years.

By the following paragraph I would like to demonstrate shortly our procedure.

5. Development of multidimensional teaching-learning arrangements - one example

Figure 2 serves as example for the long lists of goals and content in vocational education. As I said:

The actual demand of enterprises and administration cannot be satified by such linear content structure. A change is necessary. And this change offers a great intradisciplinary as well as interdisciplinary opportunity for didactics, educational psychology and the corresponding content-related sciences to develop new procedures of teaching and learning with regard to complex content and to higher learning and thinking processes. This does not mean that schools and universities should be forced to change their concept completely, but they must overcome the traditional linear series of goals and content (cf. ACHTENHAGEN/JOHN 1992; ACHTENHAGEN/TRAMM/PREISS/SEEMANN-WEYMAR/JOHN/SCHUNCK 1992; TRAMM 1992).

Figure 3 demonstrates very formally the whole context of our approach which is dominated by reflection on the content domain. We start with considering the qualification problems: academic disciplines (such as business theory) and practical needs on the worksite determine the goals of the teaching-learning processes. With regard to these aims we try to formulate an idealized thematic structure, or, in other words the goal and content structure best representing the practical and academic claims. **Figure 4** will show one example. We are confronted at this point with the problems of substantiation and legitimization. It is necessary to design constructions and to evaluate and revise them. The transposition into concrete content and teaching-learning procedures requires different steps: Thinking on students' needs, on their prior knowledge, their proficiency and motivation, relating the idealized thematic structure to single lessons and - more important - to sequences of lessons; pursuing the construction of meaningful subnetworks - by controlled procedures of content reduction; and thinking on a global evaluation concept that covers not only the cognitive, but also the emotional and motivational domain and proves whether the curricular content and goals lead to adequate actions. The most important, but until now not controlled domain can be described by the question, whether the teaching-learning processes in school stand the test in enterprises and administration.

This is possible if the didactic thinking in school and university switches over to network-like interpretations of the given curricula. **Figure 4** demonstrates the network structure behind the linearity of the list shown in **Figure 2**. The network is developed by using scientific statements on the one hand - above all from the field of business administration - and task structures found in larger enterprises on the other. This content structure, therefore, contains important and rich information on real life - and is of high relevance for learners.

Back to the attribute "multi-dimensional": This attribute gives a hint that the construction and evaluation processes of those arrangements must consider the importance and the interdependency of the following points:

- The network structure of goals and content units,
- sequences longer than one lesson of 45 minutes each,
- the use of computers and other technologies of information and communication,
- problems of teaching with the use of complex arrangements,
- problems of learning with the use of complex arrangements,
- levels of achievement and the development of personality.

With regard to these points, we are able to develop worksite- and life-related teaching-learning arrangements.

Connecting the teaching-learning processes to the prior knowledge of the students, we start the instruction of Business Administration for the first year in Commercial Schools by a movie of jeans production and certain paper sheets which use the information given by the movie. As our first complex teaching-learning arrangement is modeled by a computer-based simulation game, we start with an intricate information sheet for one of the different enterprises which have to be run by a group of students (**figure 5**). (This simulation game was developed by PREISS; cf. PREISS 1988, 1992). This sheet contains a lot of information and also many expressions which are exactly defined by the theory of business administration. We introduce - together with this sheet - other sheets with pictures from the movie or bills or other commercial documents into the classroom (**figure 6**). The students have to handle these sheets, to identify the adequate information, to select the necessary information and so on. All these tasks are also carried out at the worksite. The students accept its importance (we measure the correspondend jugdments by interviews and questionnaires).

We prepare by these procedures the tasks which have to be run and solved during the following simulation game for about 20 lessons. According to a system-oriented approach of the theory of business administration, the enterprises which are modeled by the simulation game are organized as systems with subsystems and elements. The supersystem is given by the market and its relations. **Figure 7** demonstrates a first step to understand the supersystem-system relationship. The systems approach appears during the simulation game - that means: during the first steps into our curriculum - in a relatively general way: Primarily, we have got decisions on the number of goods to produce and on their prices. By that, the enterprises compete on an oligopolistic market.

To bridge the gap between complex and non-transparent information and teaching-learning procedures, we use didactic and psychological knowledge. We work with the complex network by moving within subnets (**figure 8**). Within these subnets, the student learns to economicly argue: The higher the production figure, the higher the total cost of production (**figure 9**). The higher the production figure, the lower the production costs per piece. The lower the costs per piece, the lower the price. The lower the price, the higher - ceteris paribus - the sales. The uncertainty of the market processes enter. And so on. All these steps are tutored by computer programs: The students can use the computer for calculation but also for visualization. **Figure 10** shows the decrease of costs per piece if the production figure rises.

Aim of this procedure is to develop the economic thinking and reasoning which uses fact knowledge within a complex argumentation context. Uno actu - this argumentation has to lead to decisions which are controlled by the system. The students, therefore, get a reinforcement; they are forced by the arrangement to prove success and failure of their decisions and actions and they have to formulate reasons as well as necessary and possible consequences for the following decision processes.

We differentiate the systems approach during the next sequence of the curriculum: The simulation game is followed by another complex teaching-learning arrangement in the form of a case study which is run over about 15 lessons. One example: Within the simulation game, all production material is set as completely available during all decision periods of the simulation game. By the following case study with the title "Selection of suppliers", the students have to ask for offers, to prove and to compare the conditions of these offers, to decide which supplier should be chosen, to justify this decision, and to act, that means to write the corresponding letters which contain the relevant information according to the decisions made (cf. JOHN 1992). The subject matter units of both complex arrangements are sequenced and specified with regard to the aims of the whole curriculum. We also try to bring together goals and units of different subjects: the balance sheet which is printed at the end of each period of the simulation game has the same pattern as the balance sheet which is introduced at the same time within Accountancy, etc. (cf. PREISS/TRAMM 1990). By that procedure we try to overcome the cutting-into-pieces-strategy of the official curricula.

The other crucial point, besides the sequencing problem, is the mid-term and long-term development of problem-solving skills - and even more important: of the students' personality.

Within our project we try to foster problem-solving behavior which is combined - according to my understanding of learning for real life situations - with the handling of facts. We, therefore, observe the development of cognitive skills on five levels:

(a) We control whether the students learn facts which are proved by an external examination system. In the German commercial education system, the students have to undertake examinations which are run by the Chambers of Commerce, and not by the schools, in the form of multiple-choice tests. We, therefore, have to qualify the students by our complex teaching-learning arrangements for these external examinations, what means that we have to introduce a lot of facts which are evaluated on the level of multiple-choice items.

(b) According to the new tasks in enterprises but also according to our educational goals we try to develop content-related problem-solving skills. The decision procedures which are provoked by the simulation games, the judgment of alternatives, the discussion of main- and side-effects, the solution of complex algorithms - all these points can be interpreted as processes of complex problem-solving. These processes correspond to tasks in enterprises on one side and to tasks in the field of business administration on the other. We developed special questions to test these attitudes. A main specificum is that we construct these items in a very non-transparent way - comparable to tasks at the worksite. There is a lot of relevant, but also irrelevant information. The students have to decide which information is needed and they have to combine the given information for the solution of the item. For that, a lot of exact fact knowledge is necessary.

(c) The third dimension of evaluation is the proof by scientific criteria: We are able to control the effects of the students' decisions within their different enterprises by comparing figures of productivity, profitability, liquidity and so on, figures which were developed within the theory of business administration and used by all enterprises.

(d) The fourth dimension is to control the development of "key-qualifications": Are the students able to learn an effective argumentation behavior? Do they learn to handle problems weighing main-effects and side-effects, the pros and the cons of a problem. We did so by using an interpretation schema which was introduced by VOSS to describe the solution of ill-structured problems.

(e) The fifth point is the control of the motivational and emotional attitudes of the students. As cognition, motivation and emotion must be seen as unity, learning, especially in the long run, functions better with positive motivational and emotional conditions.

My impression is that this mixture (which has to be seen as integrated) of

- rote learning
- complex problem-solving in content-specific domain,
- control of decisions by scientificly developed standards,
- development of an adequate argumentation style, and
- of positive motivational and emotional attitudes might be a decisive prerequisite for an effective vocational learning. We evaluate this impression also by field studies which we run in departments of continuing education of large enterprises.

6. Evaluation of a complex teaching-learning arrangement

Our program was developed over several years (1985-1992). In this work, we were confronted with a severe problem: We saw on the one hand that we succeeded developing complex teaching-learning environments and arrangements, but that, on the other hand, the teachers - as said above - were not always able to handle them adequately.

We controlled the effects of our teaching-learning arrangements
- by videotaping the group and classroom processes, over months,
- by questionnaires and interviews, and
- by tests.

To control time-effects, we asked the students twice, in August (the beginning of the school year) and in the following March. I would like to report on data which show that it is not enough
- only to develop complex teaching-learning arrangements and environments.
- The decisive point is to qualify teachers as didactic experts. Teachers have to learn to handle these complex arrangements effectively. Students also must learn to use these methods. Vocational learning, therefore, must be seen in the context of teaching and helping for self-directed learning.

With regard to fact learning and to the solution of complex problem tests we succeeded (**figure 11**): The students of our experimental classes did significantly better than those of the control classes with regard to pure fact knowledge (n: = normal tasks) as well as with regard to subject-matter related problem-solving tests (ho: = higher order tasks). **Figure 11** shows overall posttest-pretest differences for different levels of significance. On the left side of the figure it is seen that the experimental classes had less losses of test item differences.

These clear results are won at the last evaluation period. During the former years we had to identify lacks with regard to the construction procedure of complex arrangements and to the teacher behavior. **Figure 12 and 13** demonstrate the development of profitability within two groups of one (poor) experimental class. The profitability went down dramatically; only group b marks a better result for the last period. We controlled these effects by an inspection of the videotapes of problem-related group discussion. At that point, the teacher overlooked his task to monitor the group activities. **Figures 14 and 15** demonstrate the decrease of problem solving related utterances in group discussions over time. The students did not sufficiently debate the pros and cons of their decisions - with probable consequences for their success. **Figure 16 and 17** show another important effect influencing the learning processes: Success within the simulation game, concentration on problems and emotion and motivation are very close and can be seen as an unity (cf. ACHTENHAGEN, 1991; BECKER/PIEHL/OLDENBÜRGER, 1987).

By interviews and so-called "flash-lights" - very short questionnaires before and after the decision periods - we observed systematically motivation and emotion (cf. SCHUNCK, 1992, 1993). The whole content of the interview of all students of one classroom is represented in the form of a tree (**figure 18**). One can observe a differentiated structure, also in the field of teacher-student interaction. If we analyze the interview structure with regard to emotional problems, we can see that the branch of teacher-student interaction disappears (**figure 19**). The lack of teachers' knowledge to handle effectively the complex arrangements tackles not only the cognitive, but also the motivational and the emotional behavior of the students.

In a fifth dimension we investigated the midterm- and longterm development of problem-solving skills and of patterns of argumentation. In Germany, this problem is discussed under the heading "key-qualifikations" for the worksite. We used a procedure which was developed by VOSS and coworkers (cf. VOSS/TYLER/YENGO, 1983). We transcribed group discussions and analyzed them. VOSS - roughly spoken - was interested in detecting differences within the argumentation structure of persons with different economic background. He idealtypically separated novices and experts. **Figure 20** shows the argumentation structure of a novice, e.g. of a person with some basic economic knowledge (p. 217). The vertical lines symbolize a series of relatively isolated statements which are not well elaborated with regard to constraints etc. **Figure 21** demonstrates a typical finding out of our protocols (cf. JOHN, 1992). The difference to the novice structure is clear: fewer statements, but a better elaboration of the arguments. This result can be interpreted as some progress of handling subject-matter related argumentation structures. That means that complex teaching-learning arrangements and environments can foster a behavior which is needed in the worksite and in political and social life.

The sixth dimension of evaluation was the description of the structures of students' prior knowledge and its change as a result of the instructional process (cf. WEBER, 1993, 1994). The corresponding results will be discussed by the author within this symposium.

7. Some conclusions

In short, we would like to summarize:

(a) Complex, technology-rich teaching-learning arrangements are needed.

(b) Commercial education is able by these methods to react to challenges of the worksite and real life.

(c) Simulation methods are powerful tools; it is possible to foster uno actu knowledge of facts and knowledge of problem-solving with relation to specific subject matter. This might be a basis for general problem-solving techniques - and the opportunity for effective commercial learning might lie here.

(d) Complex teaching-learning arrangements can help developing affective skills and key-qualifications.

(e) Research on curriculum and teaching-learning problems can change the quality of goal and content structures.

(f) Three main problems can be specified at the moment:

  (aa) The sequencing problem, that means the embedding of complex arrangements into a curriculum;
  (bb) the optimal handling of the complex methods by the teachers and by the students;
  (cc) the measurement of changes of knowledge over time.

All these questions lead to new and very complex research designs. But as we identify a lot of well developed complex environments and arrangements in different countries, we got the material to run our research effectively. By using these arrangements, we get a basis for developing, fostering, and evaluating teaching-learning processes in schools and enterprises by which we can prepare young people with regard to the new "megatrends" at the worksite and in life.

Figure 1: "Megatrends" in life and in the worksite

Exogenous trends:	Endogenous trends:	Consequences
Demography: * cuts in the pyramids of population * increasing heterogenity ** school level ** age ** nationalities	Internationalization of economy	Systemic rationalization
Individualization of value patterns	Increasing number of research results and their transformation into technologies	Slimming down the hierarchical system/lean production
	Increasing use of new information and communication technology	Increase of * the tertiary/service sector * "tertiary" jobs within all sectors of the labor market * "tertiary" activities within jobs
	Worldwide use of resources and of environmental conditions	

Figure 2: Content and goals for the first lessons in Business Administration

standard-time in lessons	content units	learning aims
10	1. Performance Processes in Business and Administration	The student should
	1.1 Private economic goals	- know the private economic goals
	1.2 Ratios for evaluation of the profit-making goal	- know and distinguish economic ratios for evaluation of the profit-making goal
	Productivity	- measure the quantitative yield of the use of goods and services
	Economic efficiency	- understand the necessity of acting according to the economic principle
	Profitability	- calculate the profitability as relation between deployed capital and profit
	Liquidity	- evaluate the solvency using the ratios of liquidity
	1.3 Public economic goals	- term serving the public welfare as purpose of non profit-making enterprises
	1.4 Goals of the public administration and judicature	- be acquainted with the social responsibility in administration and judicature by means of the state welfare assistance * - know life providence, security, order, stability of the law and justice as further goals * - understand the validity of economic principles to the public administration * - realize that for the public administration the ratio profitability is limited.
80	2. Basics in law ...	The student should ...

* - aims only for high achivers

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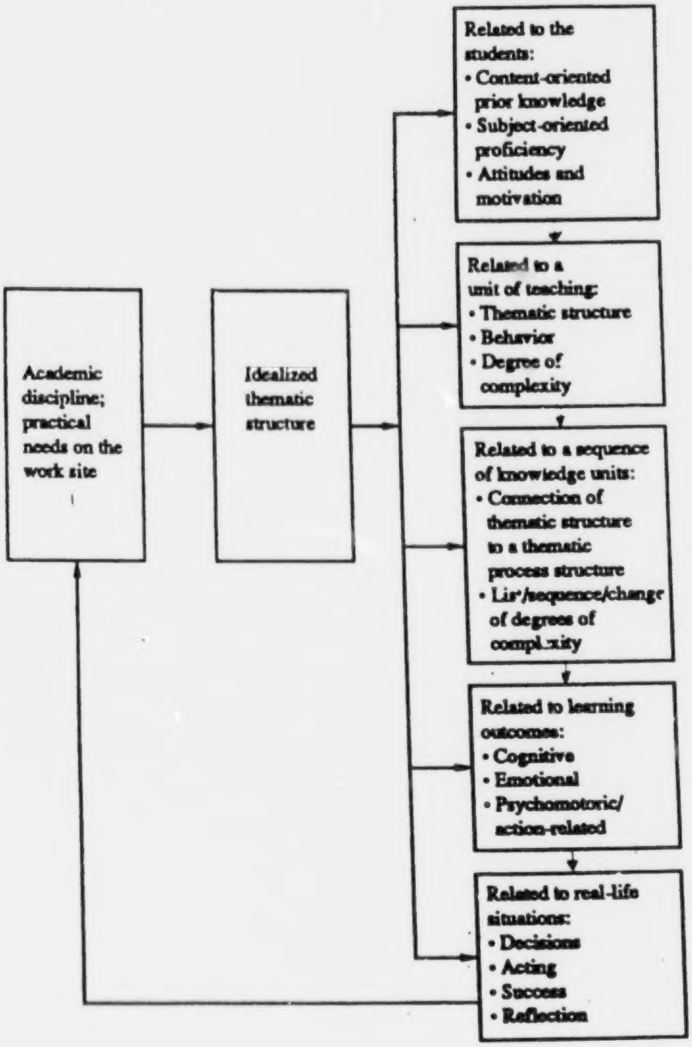
Figure 3: Content in teaching-learning processes


Academic discipline; practical needs on the work site
Idealized thematic structure
Related to the students:
• Content-oriented prior knowledge
• Subject-oriented proficiency
• Attitudes and motivation
Related to a unit of teaching:
• Thematic structure
• Behavior
• Degree of complexity
Related to a sequence of knowledge units:
• Connection of thematic structure to a thematic process structure
• List/sequence/change of degrees of complexity
Related to learning outcomes:
• Cognitive
• Emotional
• Psychomotoric/ action-related
Related to real-life situations:
• Decisions
• Acting
• Success
• Reflection

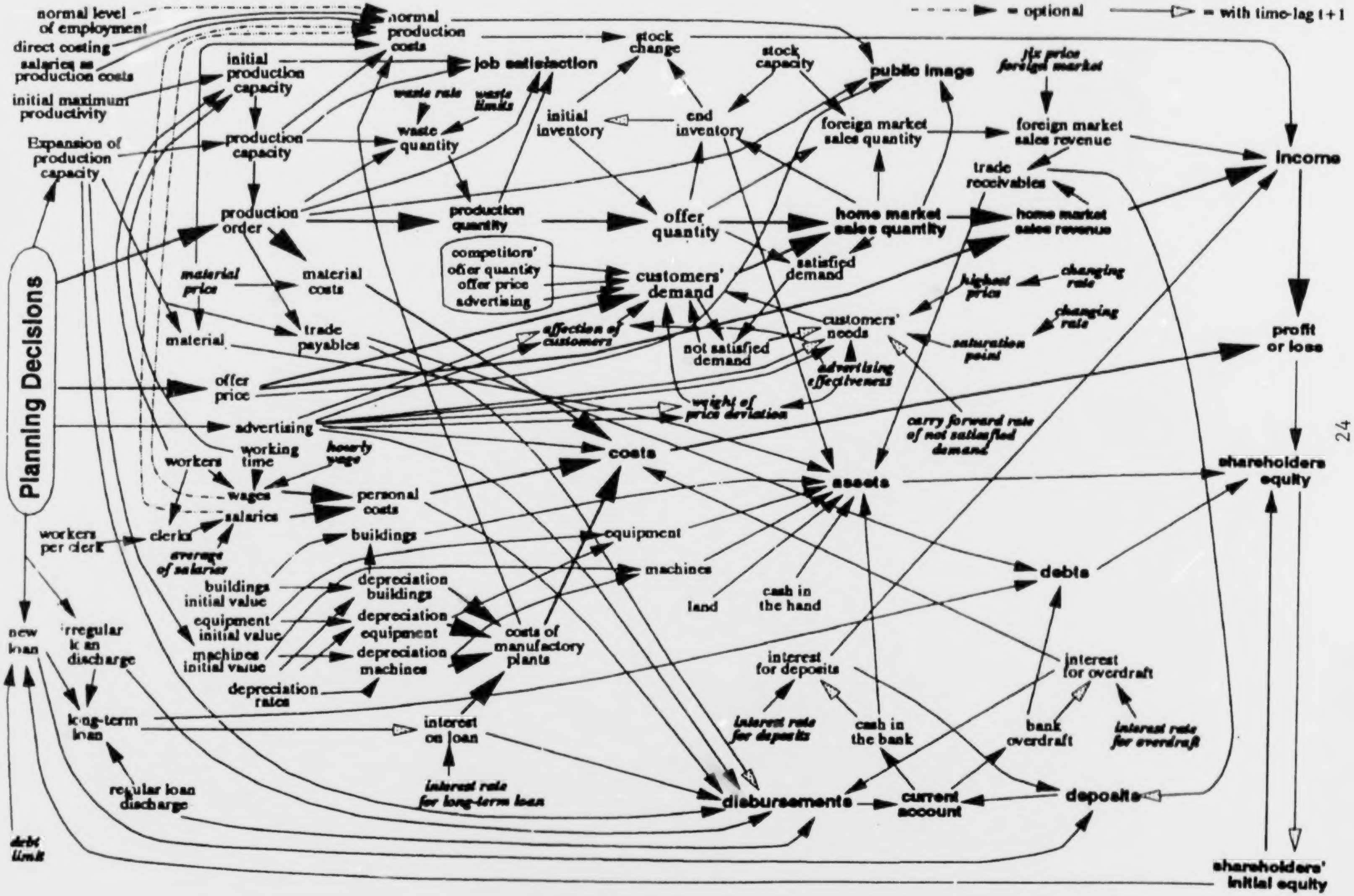

- - - - ▶ = optional
——▷ = with time-lag t+1
normal level of employment
direct costing
salaries as production costs
initial maximum productivity
Expansion of production capacity
Planning Decisions
normal production costs
initial production capacity
production capacity
production order
stock change
job satisfaction
waste rate
waste limits
waste quantity
initial inventory
end inventory
stock capacity
public image
fix price foreign market
foreign market sales quantity
foreign market sales revenue
income
trade receivables
production quantity
offer quantity
home market sales quantity
home market sales revenue
competitors' offer quantity offer price advertising
customers' demand
satisfied demand
highest price
changing rate
changing rate
material price
material costs
material
trade payables
affection of customers
not satisfied demand
customers' needs
saturation point
profit or loss
advertising effectiveness
offer price
weight of price deviation
advertising
carry forward rate of not satisfied demand
working time
hourly wage
workers
wages
salaries
personal costs
costs
assets
shareholders equity
workers per clerk
clerks
average of salaries
buildings
equipment
machines
debts
buildings initial value
equipment initial value
machines initial value
depreciation buildings
depreciation equipment
depreciation machines
depreciation rates
costs of manufactory plants
land
cash in the hand
new loan
irregular loan discharge
long-term loan
regular loan discharge
debt limit
interest on loan
interest rate for long-term loan
interest for deposits
interest rate for deposits
cash in the bank
interest for overdraft
bank overdraft
interest rate for overdraft
disbursements
current account
deposits
shareholders' initial equity

Figure 4: Reconstruction of the content and the goals for the first lessons in Business Administration - by means of a network approach

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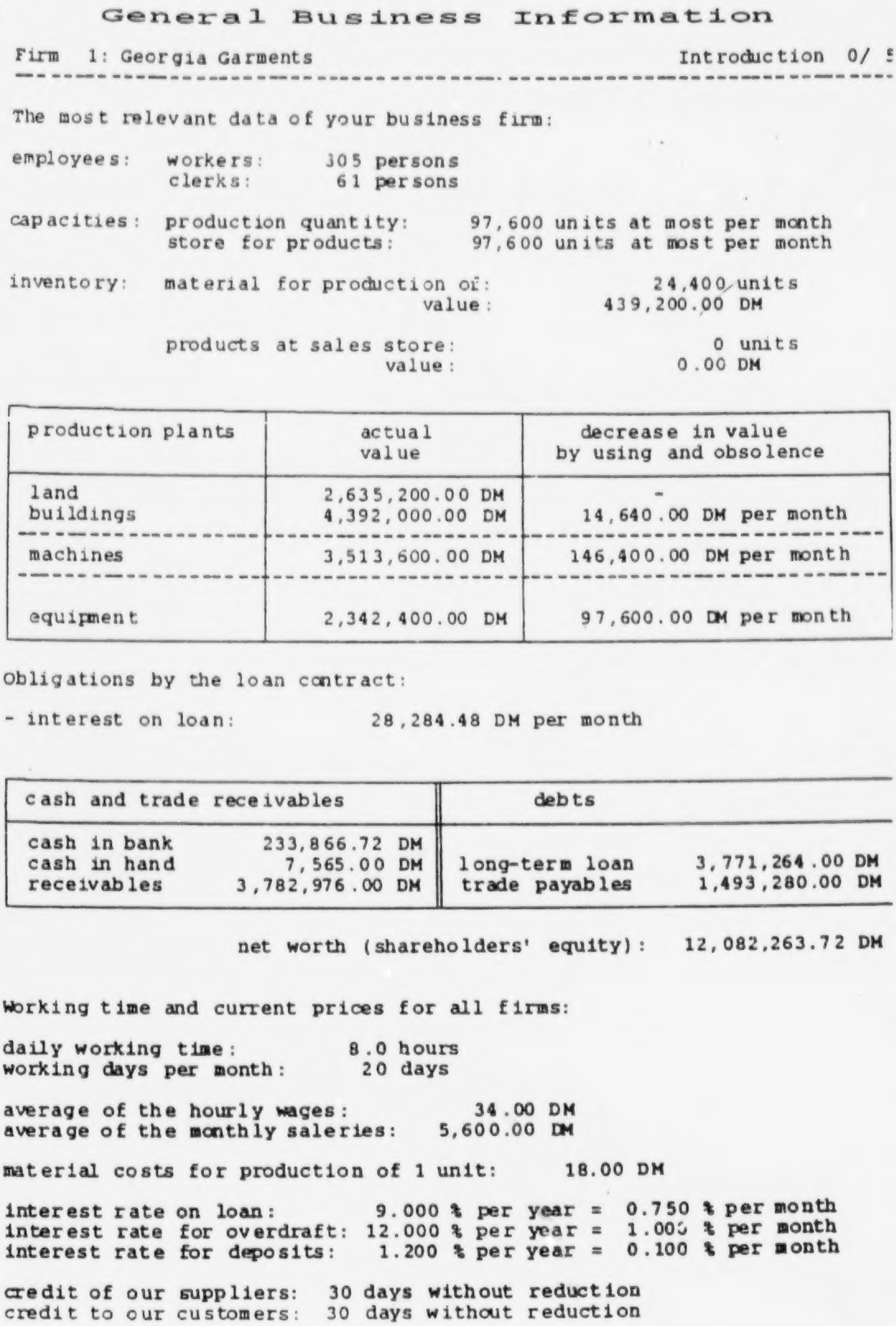
Figure 5: Part of an information sheet for one of the enterprises within a computer-based simulation game



General Business Information

Firm 1: Georgia Garments Introduction 0/ 5

The most relevant data of your business firm:

employees:	workers:	305 persons
	clerks:	61 persons
capacities:	production quantity:	97,600 units at most per month
	store for products:	97,600 units at most per month
inventory:	material for production of:	24,400 units
	value:	439,200.00 DM
	products at sales store:	0 units
	value:	0.00 DM

production plants	actual value	decrease in value by using and obsolence
land	2,635,200.00 DM	-
buildings	4,392,000.00 DM	14,640.00 DM per month
machines	3,513,600.00 DM	146,400.00 DM per month
equipment	2,342,400.00 DM	97,600.00 DM per month

Obligations by the loan contract:

- interest on loan: 28,284.48 DM per month

cash and trade receivables		debts	
cash in bank	233,866.72 DM		
cash in hand	7,565.00 DM	long-term loan	3,771,264.00 DM
receivables	3,782,976.00 DM	trade payables	1,493,280.00 DM

net worth (shareholders' equity): 12,082,263.72 DM

Working time and current prices for all firms:

daily working time: 8.0 hours
working days per month: 20 days

average of the hourly wages: 34.00 DM
average of the monthly saleries: 5,600.00 DM

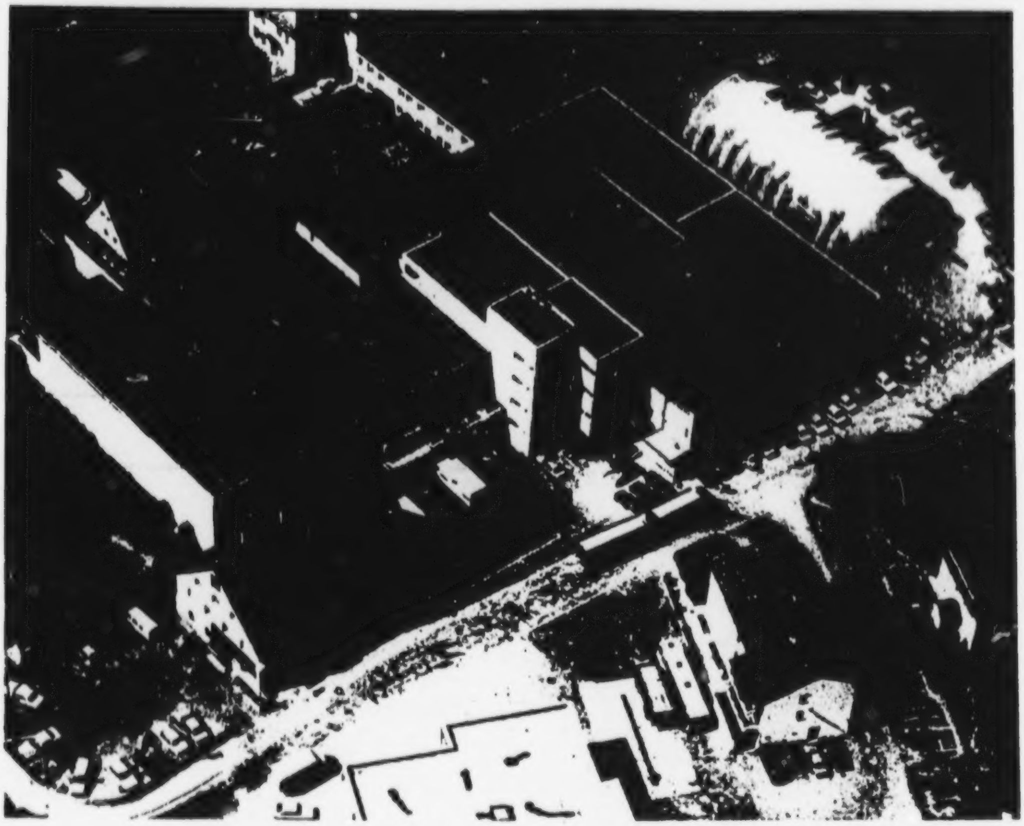
material costs for production of 1 unit: 18.00 DM

interest rate on loan: 9.000 % per year = 0.750 % per month
interest rate for overdraft: 12.000 % per year = 1.000 % per month
interest rate for deposits: 1.200 % per year = 0.100 % per month

credit of our suppliers: 30 days without reduction
credit to our customers: 30 days without reduction

Figure 6: Example of additional information on the individual enterprise - run by the students

Land and Buildings



These are our manufacturing plants and our administration building.

When we established our firm we bought the area where we constructed the buildings. The bills of the building contractors were paid completely.

The land has an actual value of ________________ DM.

Because it doesn't wear-out, the value is unchanged.

The buildings have gone down in value constantly because of utilization and obsolence.

The buildings have an actual value of ________________ DM

and their wear and tear is ________________ DM every month.

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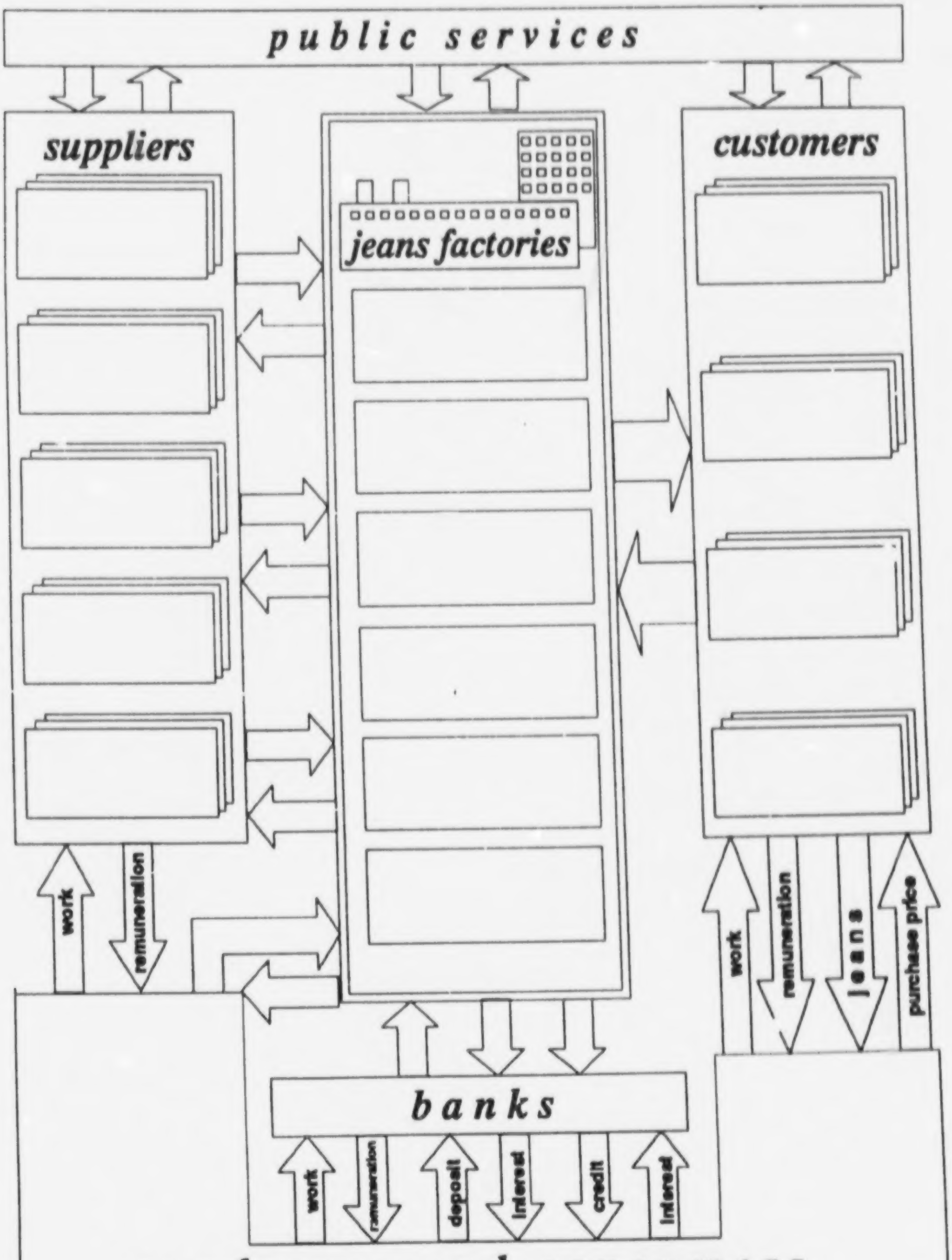
Figure 7: Demonstration of the system approach of the simulation game

Simulation Game Jeansfactory *Student's Manual* *Introduction / 4*

Jeansfactories in the Economy


public services
suppliers
jeans factories
customers
work
remuneration
work
remuneration
jeans
purchase price
banks
work
remuneration
deposit
interest
credit
interest
employees and consumers

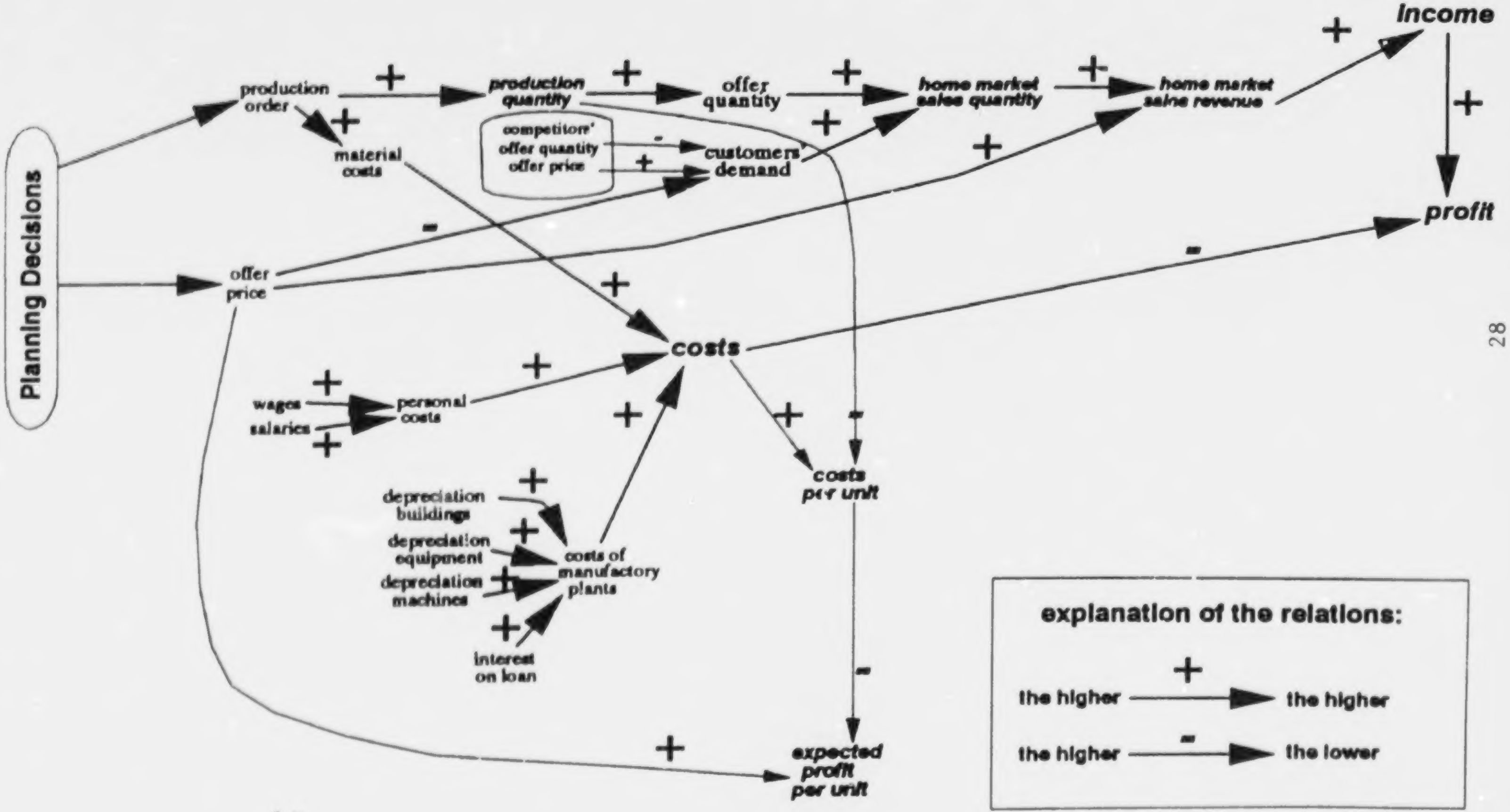

Planning Decisions
production order
production quantity
offer quantity
home market sales quantity
home market sales revenue
income
profit
material costs
competitors' offer quantity offer price
customers' demand
offer price
costs
wages
salaries
personal costs
depreciation buildings
depreciation equipment
depreciation machines
interest on loan
costs of manufactory plants
costs per unit
expected profit per unit
+
-
explanation of the relations:
the higher
the higher
the higher
the lower

Figure 8: Subnet of the total content and goal structure of the official curriculum and the simulation game

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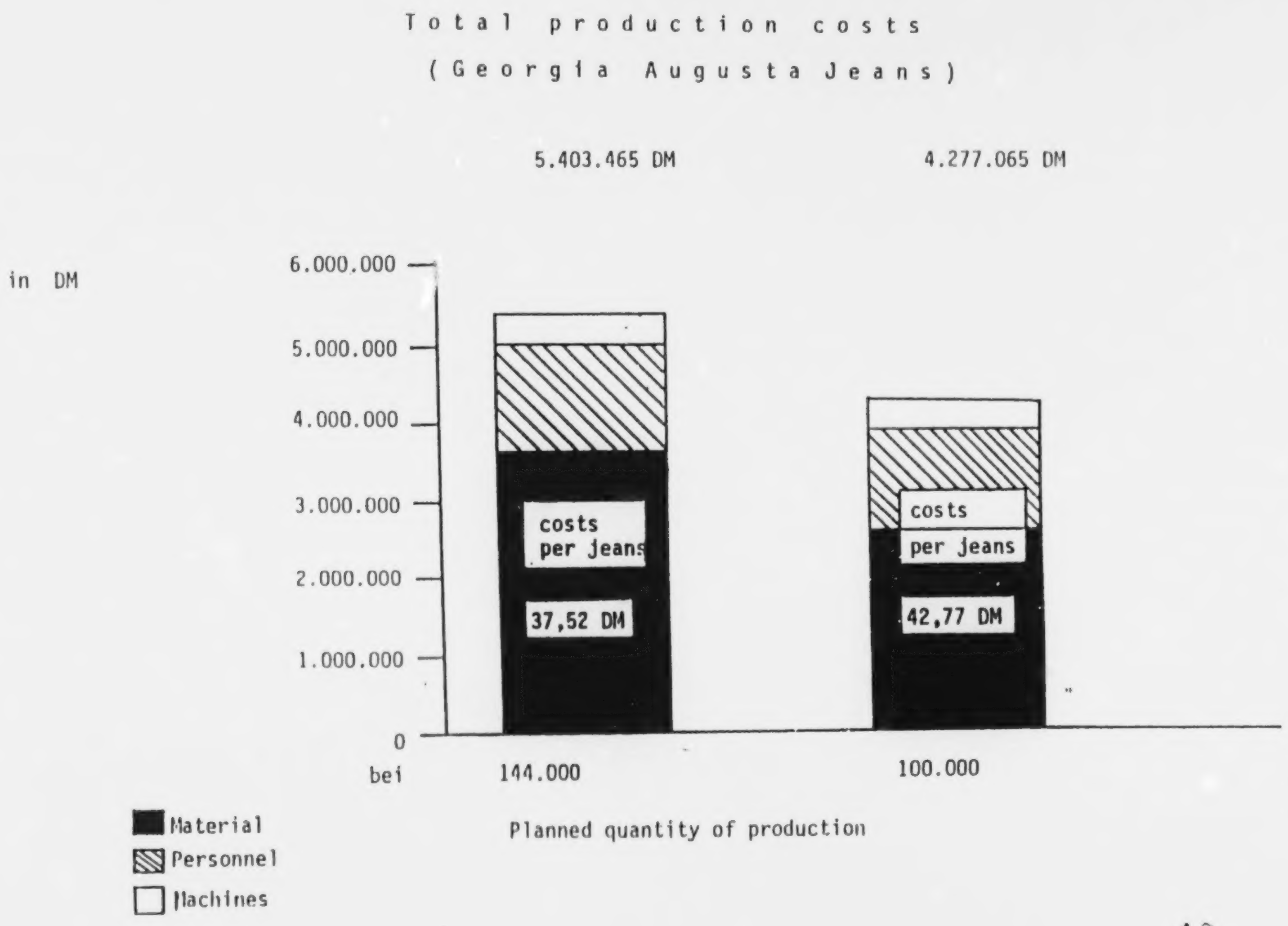

Figure 9: Comparison of total production costs - a basis for economic reasoning

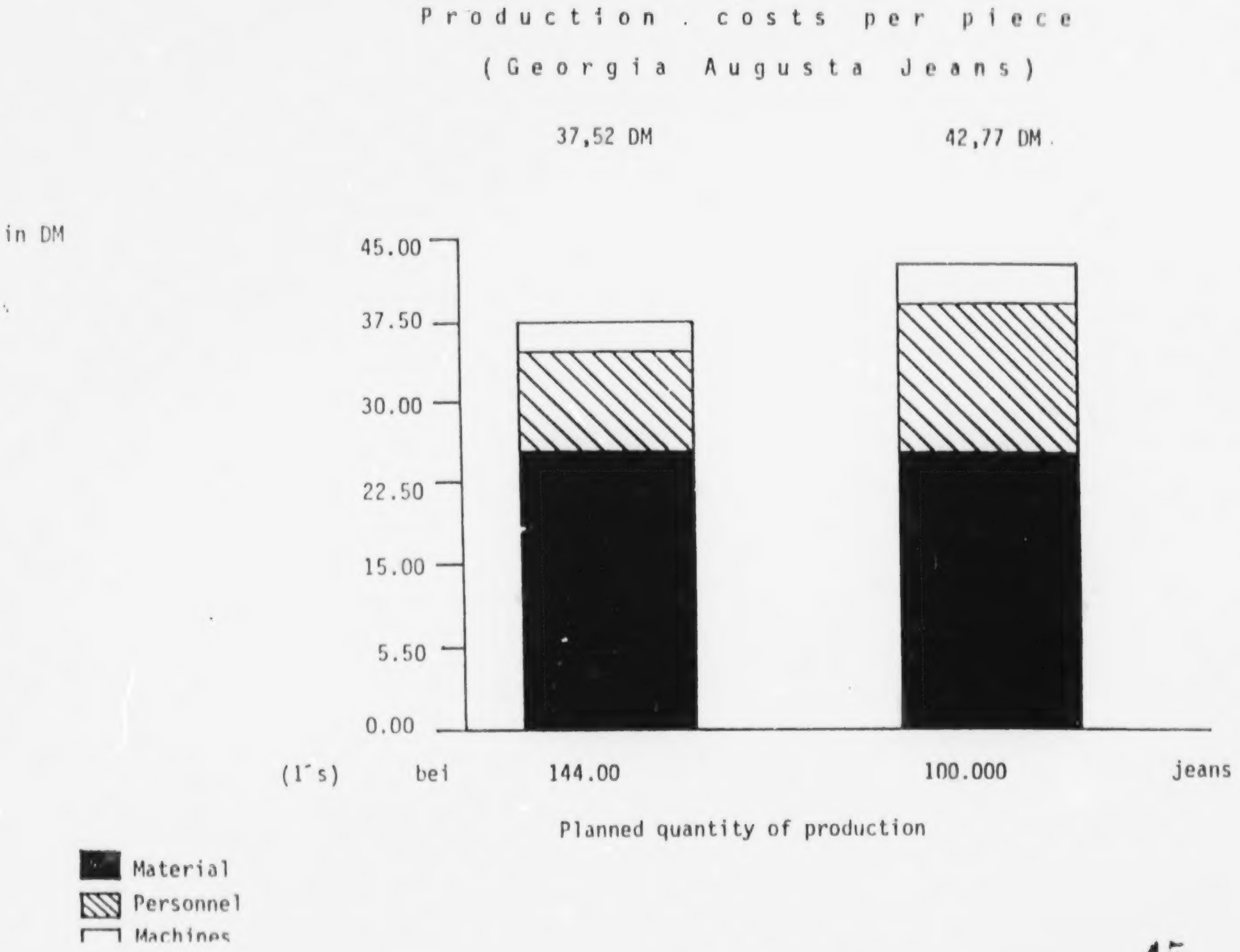

Figure 10: Comparison of production costs per piece - a basis for economic reasoning

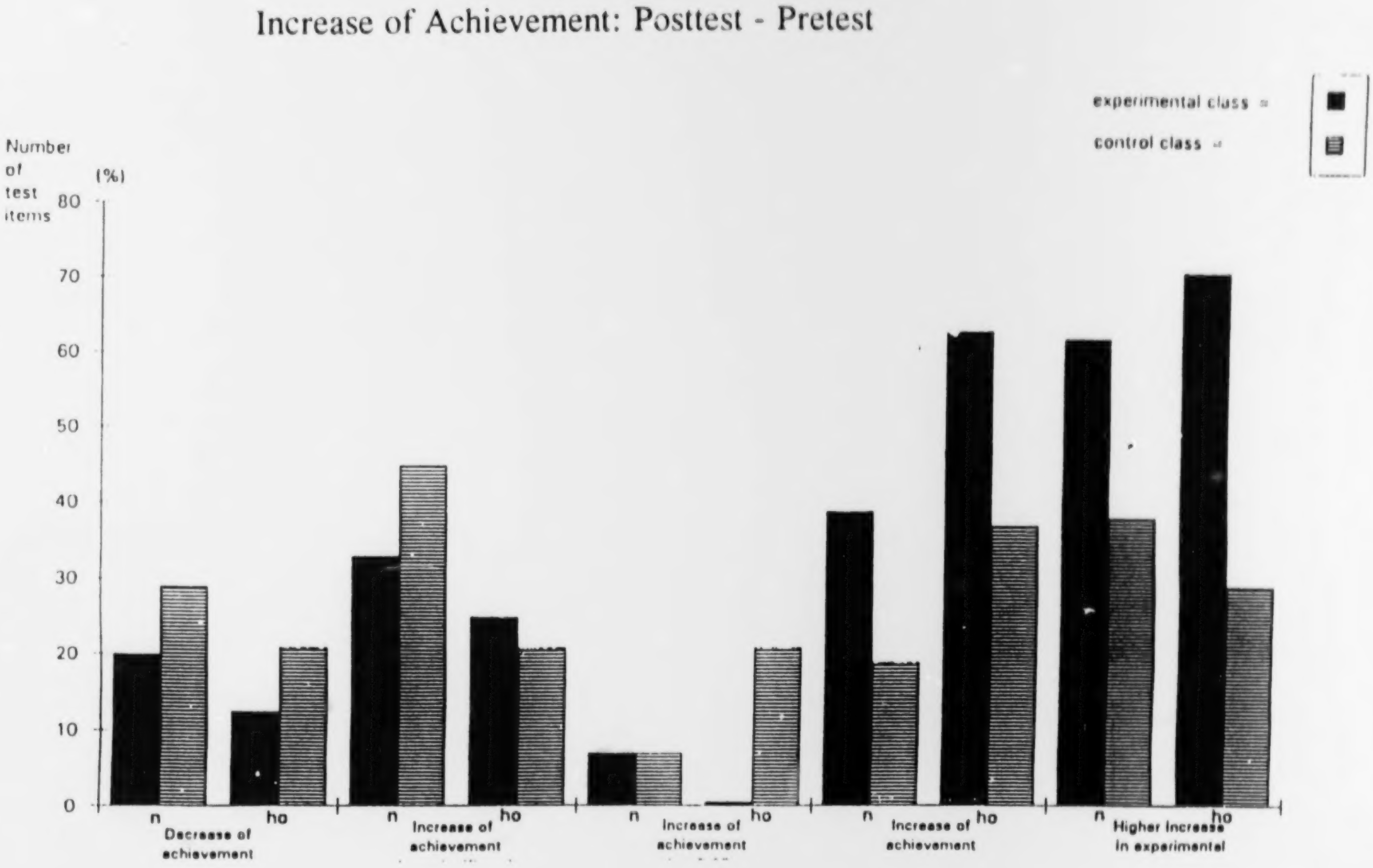

Figure 11: Increase of Achievement: Posttest - Pretest

Figure 12: Group 1a: Profitability

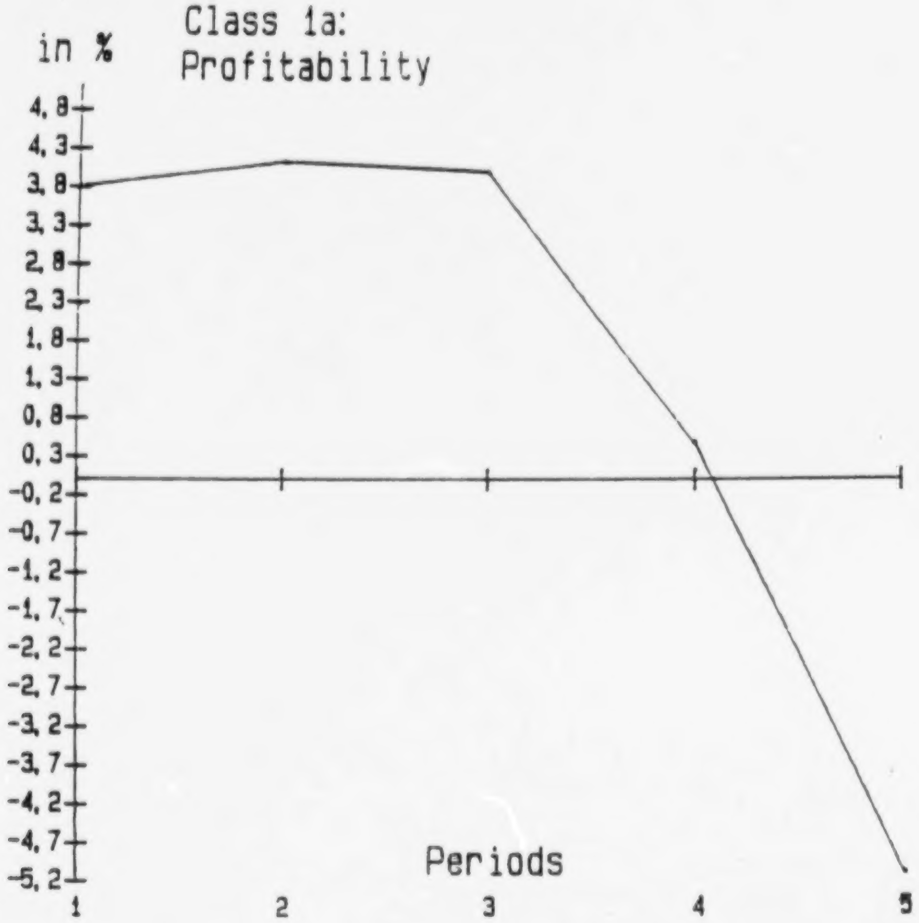

Figure 13: Group 1b: Profitability

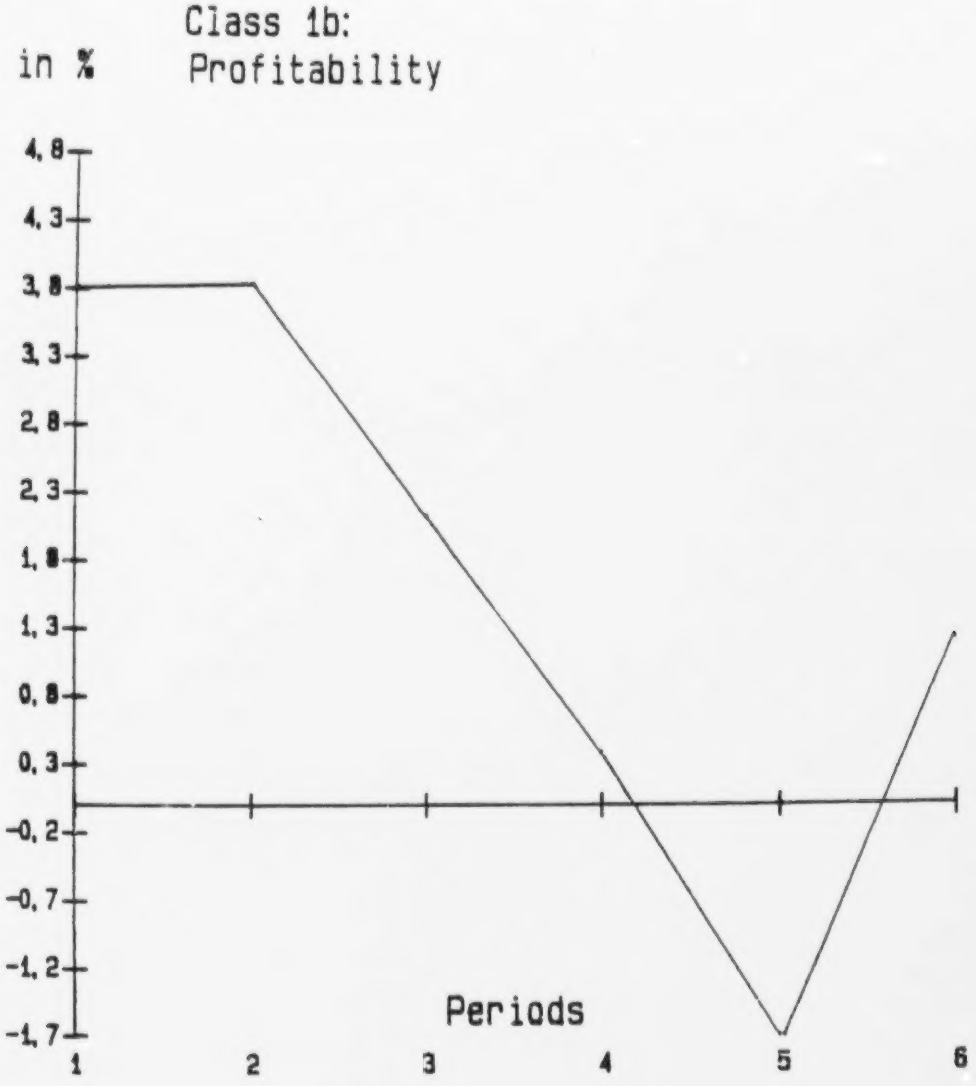

Figure 14: Group 1a: Frequencies of problem solving-related utterances in group discussion

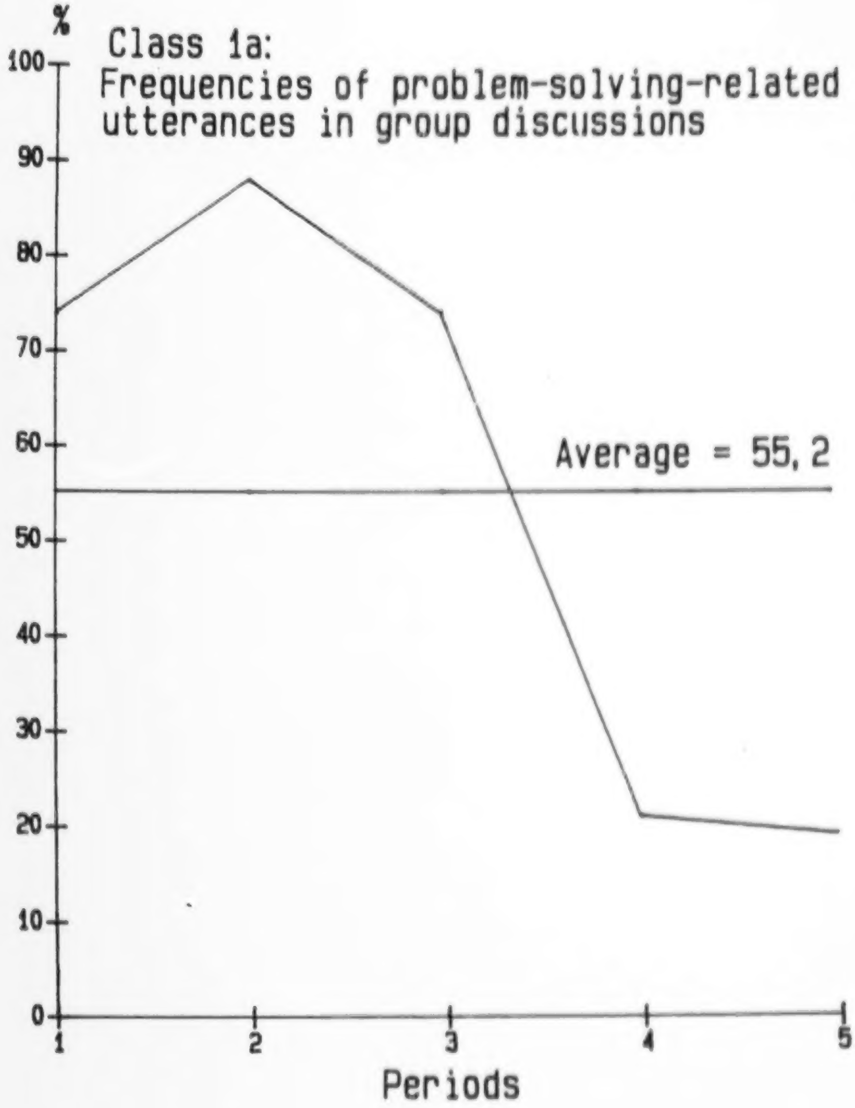

Figure 15: Group 1b: Frequencies of problem solving-related utterances in group discussion

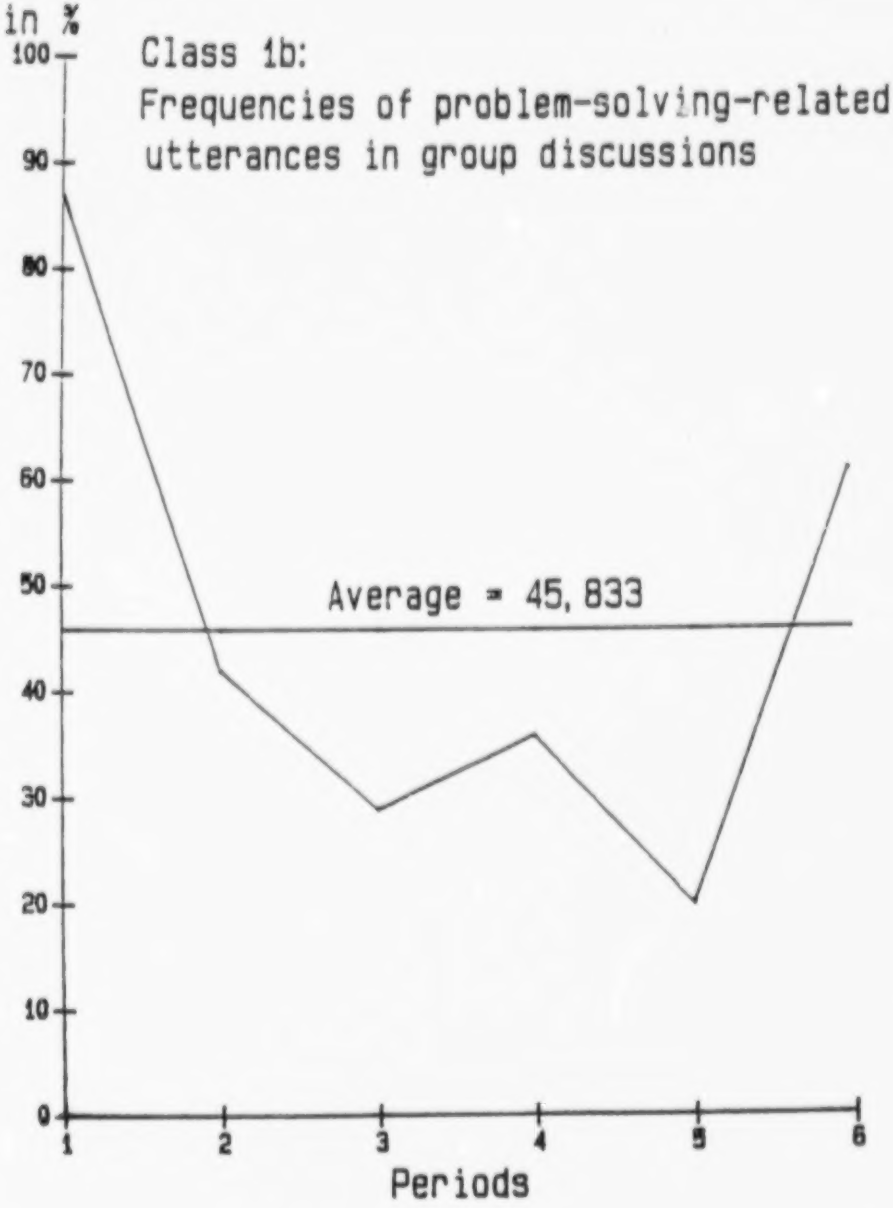

Figure 16: Group 1a: Positively toned emotional utterances in relation to the total emotional utterances

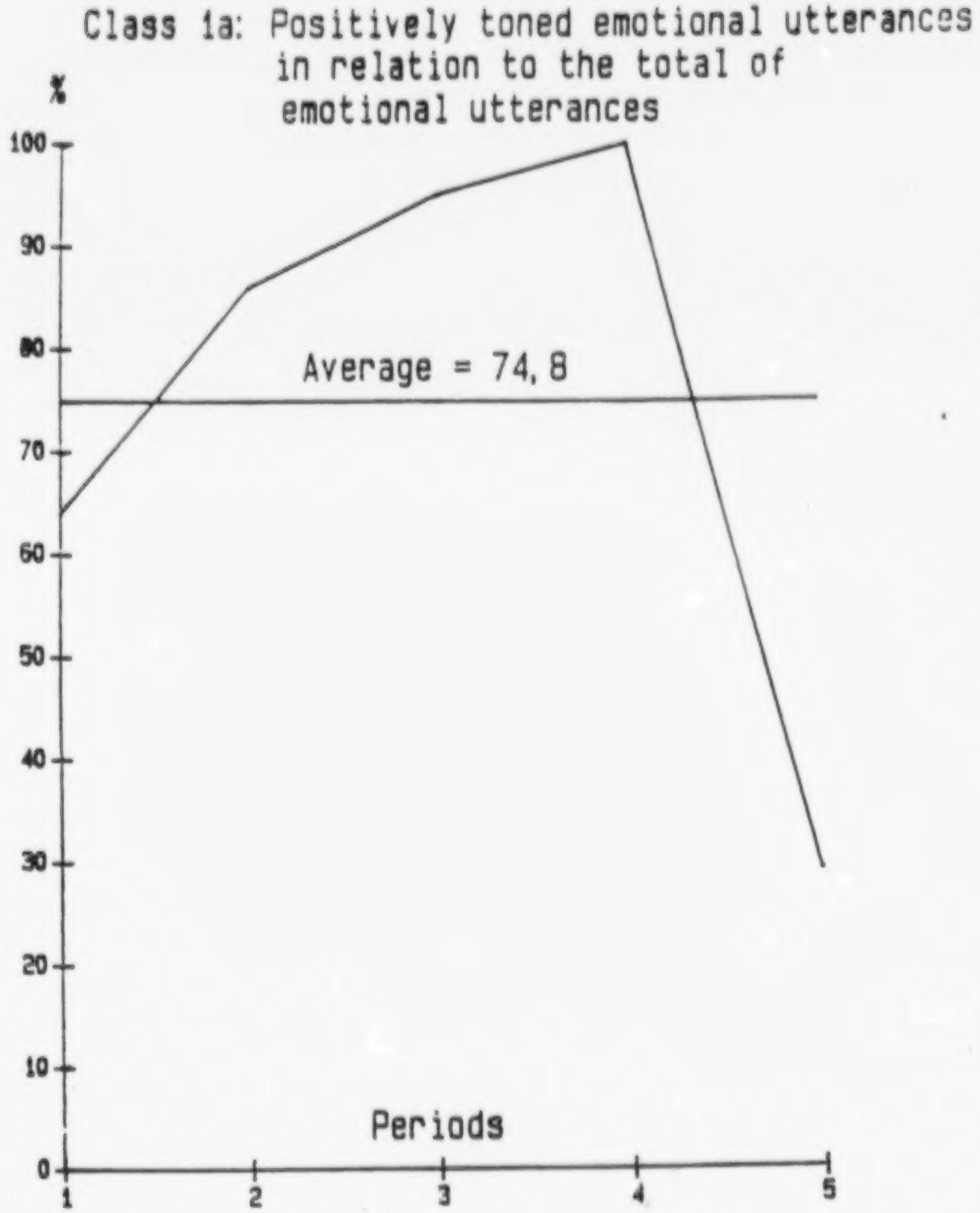

Figure 17: Group 1b: Positively toned emotional utterances in relation to the total of emotional utterances

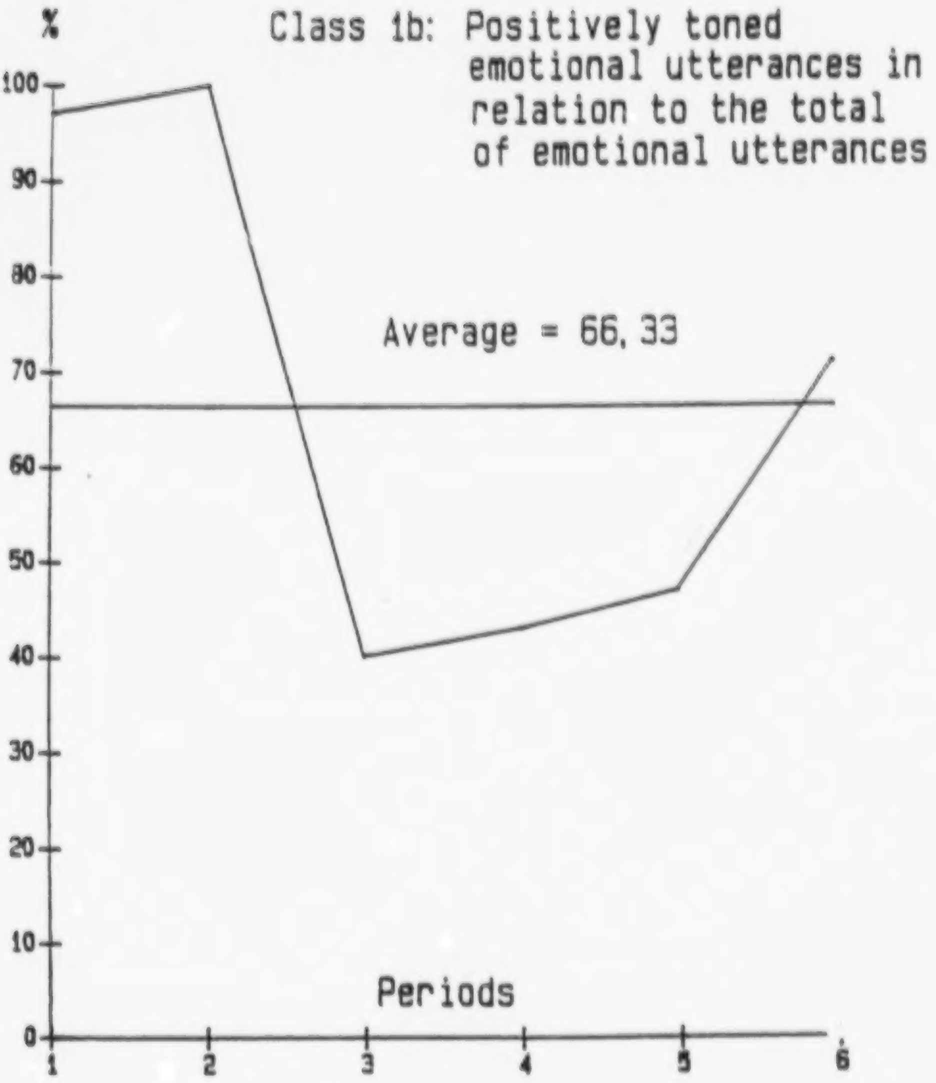

Figure 18: Interview data on cognitive, emotional and motivational effects of a computer-based simulation game

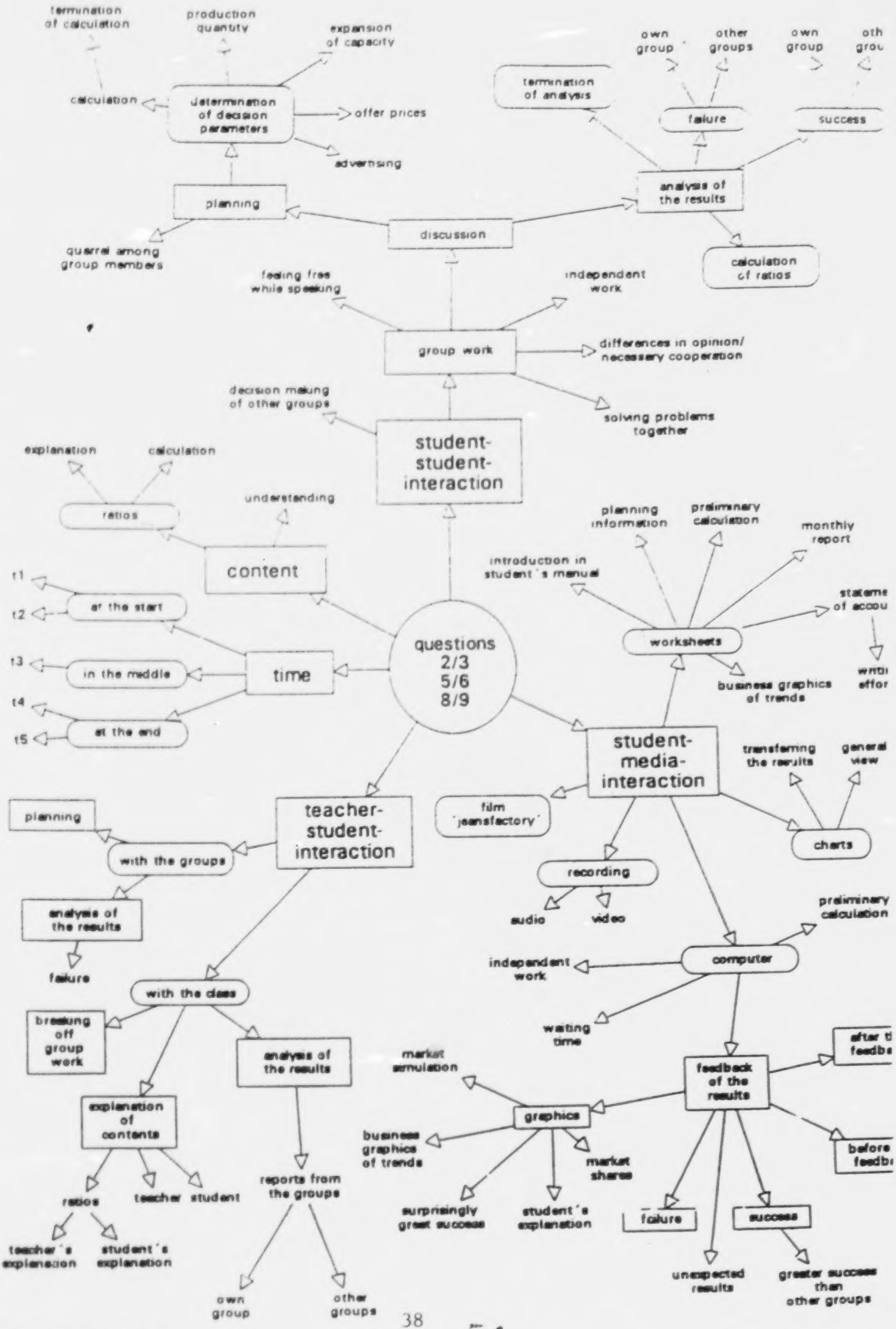
termination of calculation
production quantity
expansion of capacity
calculation
determination of decision parameters
offer prices
advertising
planning
quarrel among group members
discussion
analysis of the results
termination of analysis
own group
other groups
own group
oth grou
failure
success
calculation of ratios
feeling free while speaking
independent work
group work
differences in opinion/ necessary cooperation
solving problems together
decision making of other groups
student-student-interaction
explanation
calculation
ratios
understanding
content
t1
t2
at the start
t3
in the middle
t4
t5
at the end
time
questions 2/3 5/6 8/9
planning information
preliminary calculation
monthly report
introduction in student's manual
stateme of accou
worksheets
business graphics of trends
writi effor
student-media-interaction
transferring the results
general view
charts
film 'jeansfactory'
recording
audio
video
preliminary calculation
independent work
computer
waiting time
teacher-student-interaction
planning
with the groups
analysis of the results
failure
with the class
breaking off group work
analysis of the results
explanation of contents
ratios
teacher
student
teacher's explanation
student's explanation
reports from the groups
own group
other groups
after t feedb
feedback of the results
market simulation
graphics
business graphics of trends
market shares
surprisingly great success
student's explanation
before feedb
failure
success
unexpected results
greater success than other groups

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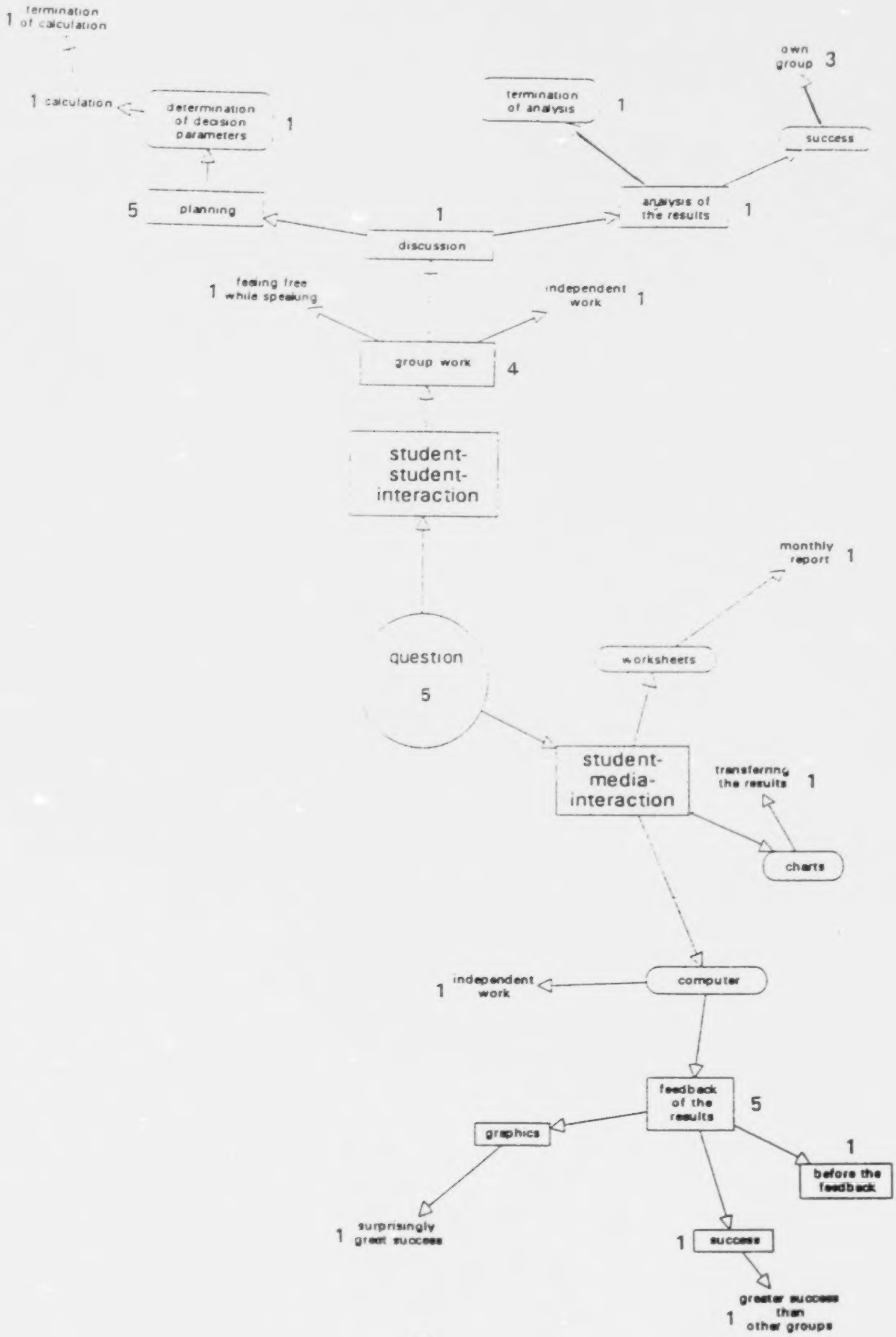
Figure 19: Interview data on the single question: In which situations did you feel well?



1 termination of calculation
1 calculation
determination of decision parameters 1
5 planning
1 discussion
termination of analysis 1
own group 3
success
analysis of the results 1
1 feeling free while speaking
independent work 1
group work 4
student-student-interaction
monthly report 1
question 5
worksheets
student-media-interaction
transferring the results 1
charts
1 independent work
computer
feedback of the results 5
graphics
1 before the feedback
1 surprisingly great success
1 success
1 greater success than other groups

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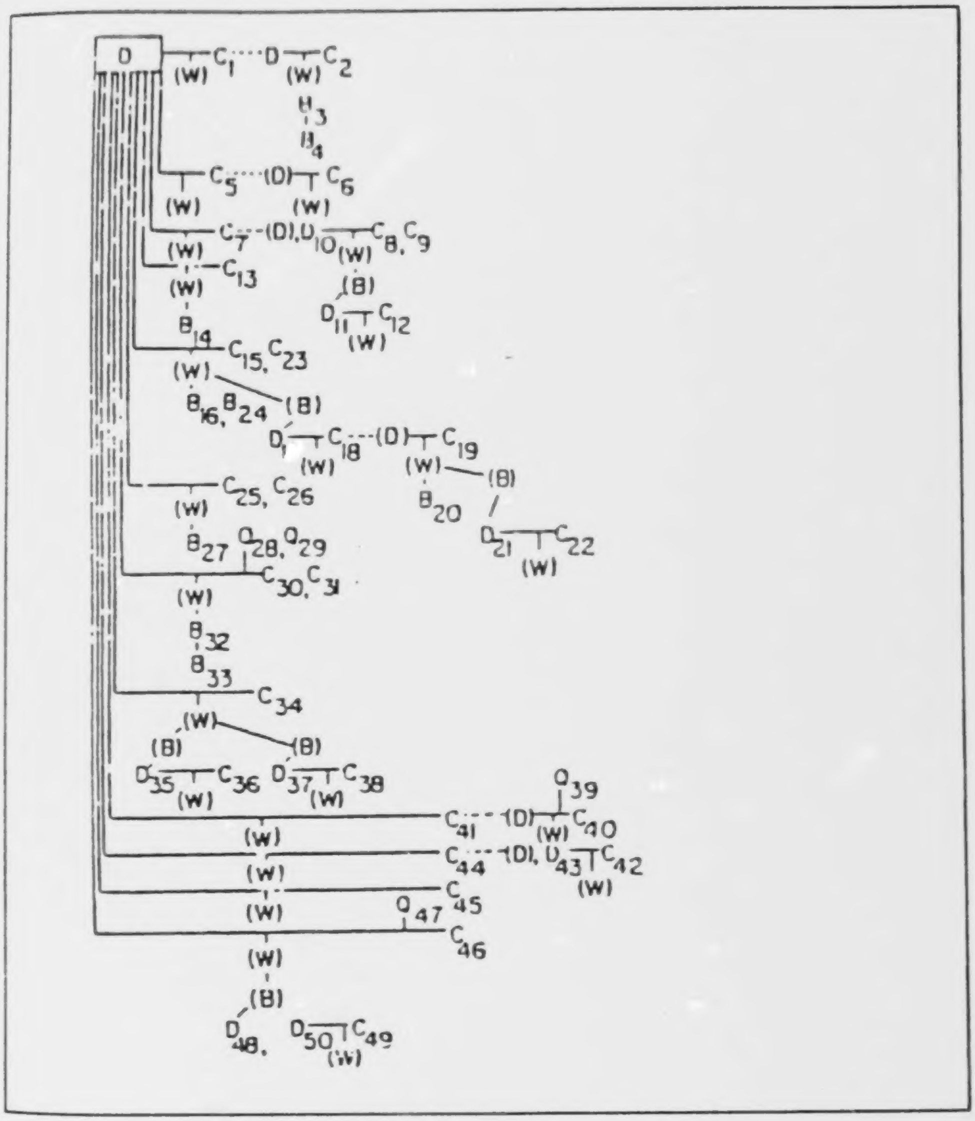
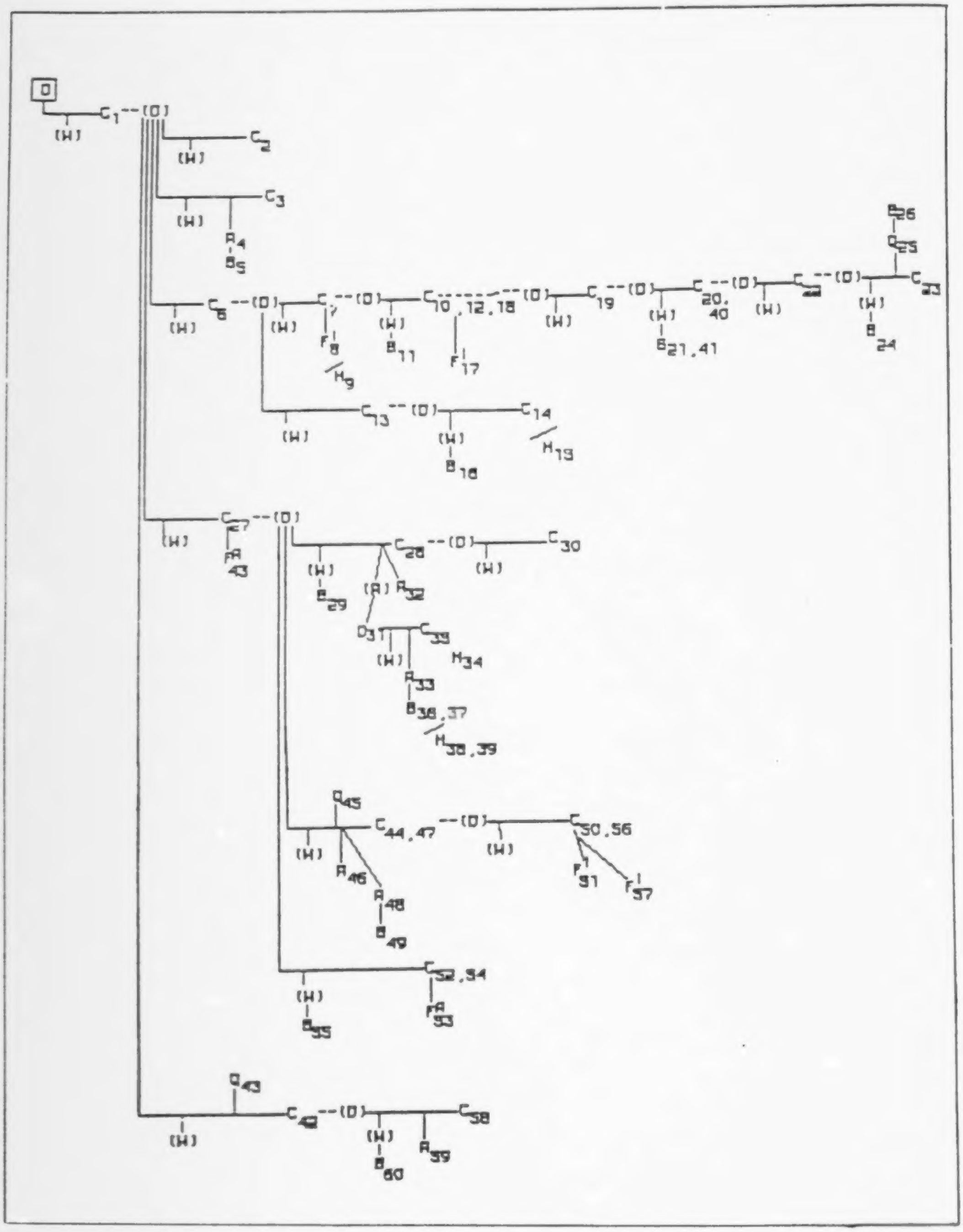
Figure 20: Argumentation structure of a novice



D
(W) C1 ··· D (W) C2
B3
B4
(W) C5 ··· (D) (W) C6
(W) C7 ··· (D), D10 (W) C8, C9
(W) C13
(B)
D11 (W) C12
B14 (W) C15, C23
B16, B24 (B)
D17 (W) C18 ··· (D) (W) C19
(B)
B20
D21 (W) C22
(W) C25, C26
B27 D28, D29
(W) C30, C31
B32
B33
C34
(W)
(B) (B)
D35 (W) C36 D37 (W) C38
D39
(W) C41 ··· (D) (W) C40
(W) C44 ··· (D), D43 (W) C42
(W) C45
D47
(W) C46
(B)
D48, D50 (W) C49

Figure 21: Argumentation structure of a group discussion (experimental class)


D
(W)
C1
(D)
C2
C3
R4
B5
C6
C7
F8
H9
C10,12,18
B11
F17
C19
C20,40
B21,41
C22
C23
B24
Q25
B26
C13
C14
B16
H15
C27
R43
C28
B29
(R)
R32
D31
C35
H34
R33
B36,37
H38,39
C30
Q45
C44,47
R46
R48
B49
C50,56
F51
F57
C52,54
R53
B55
Q43
C42
B60
R59
C58

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TOWARD THE NEW VOCATIONALISM: CRITICAL PERSPECTIVES ON EDUCATION AND WORK

Debra D. Bragg
University of Illinois at Urbana-Champaign

Penny Burge
Virginia Polytechnic Institute and State University

Kenneth Gray
Pennsylvania State University

W. Norton Grubb
University of California at Berkeley

Richard D. Lakes
Georgia State University

L. Allen Phelps
University of Wisconsin at Madison

Symposium presented at the
American Educational Research Association Meeting
New Orleans, Louisiana
April, 1994

TOWARD THE NEW VOCATIONALISM: CRITICAL PERSPECTIVES ON EDUCATION AND WORK

Debra D. Bragg, Penny Burge, Kenneth Gray, W. Norton Grubb, Richard D. Lakes, & L. Allen Phelps

OVERVIEW

This PBS-style panel will provide the opportunity for a group of researchers and audience participants to explore critical issues concerning reform of vocational education, sometimes referred to as "the new vocationalism." The topic is particularly timely as the idea of using work as the context for learning relates directly to this year's AERA conference theme of "Alternative Learning Environments: Work, School, Play." Each panelist will make brief introductory remarks (specified later in this proposal) and then contribute to a large group discussion surrounding the new vocationalism. The session will encourage discussion regarding contemporary policy and practice in vocational education and demand critical observations from panelists and participants about the promise and problems in blending education and work.

PANEL OBJECTIVES

1. Briefly present theory, research, and practice pertinent to the development and/or implementation of contemporary vocational education, e.g., school-to-work, tech prep, integration of academic and vocational education. Each speaker will present issues related to these programs and offer alternatives for how they believe these programs could be conceptualized.
2. Pose questions to other panelists and participants to generate discussion surrounding issues that remain unanswered regarding the new vocationalism.
3. Generate new and/or alternative hypotheses about educational reform that need to be addressed to create a foundation for further study of the new vocationalism.

EDUCATIONAL IMPORTANCE OF THE SESSION

The need for change in vocational education pedagogy is painfully apparent. Criticisms of existing vocational education policy and practice include its focus on preparation of students for low-level jobs, its over-reliance on skill-specific training, its isolation from the rest of secondary and postsecondary curricula, and its failure to address all but limited aspects of what it means to work in our modern society. Attempts to address these issues have been advanced in recent years by policy makers and scholars. Advocates of a critical pedagogy for vocational education (Lakes, 1991; Simon, Dippo, & Schenke, 1991) and a new concept of vocationalism (Benson, 1992) have been particularly exuberant in their objections to current practice. Their visions call for moving vocational education beyond teaching technical skills to facilitating learning about what it means to work and about how work is influenced by the social and cultural context of the workplace (Simon, Dippo, & Schenke, 1991). Lakes (1991) and others have purported a critical pedagogy for vocational-technical education that empowers students to be active change agents in shaping the democratic community.

Current developments in vocational education reflect the federal mandates of the 1990 Perkins II legislation. Approaches to integrate academic and vocational education, tech prep, and more recent advances in school-to-work transition such as youth apprenticeship may be responses to critics of traditional vocational education. What is not known is whether these policies and subsequent programmatic responses are appropriate or adequate to lead to the new vocationalism? Will they repeat the problems of former vocational education approaches? If so, what other approaches will be needed? Considering and debating these questions will be at the heart of this AERA session.

ALTERNATIVE PERSPECTIVES

Kenneth Gray will describe what schooling is like for what he refers to as the 'invisible middle.' His remarks will be drawn from a recent study of the secondary school experiences of 1,300 graduates of seven Pennsylvania high schools. The perspective he will share is of the importance of creating an alternative learning environment for the 'average' student. Research findings from his study support the notion that the existing non-integrated high school curriculum (i.e., college prep, general education, vocational education) is ineffectual for all but a few, the college-bound students.

W. Norton Grubb's research in the area of integration of academic and vocational education will provide the framework for his comments. He has been an enthusiastic supporter of academic and vocational curriculum integration within the comprehensive high school, however he is quick to point out that not just any integration is effective. Low-level academics combined with poor vocational skills training is not the solution to the problems of high schools. Dr. Grubb will describe predominant approaches to academic and vocational education that are emerging today and point out their merits and drawbacks. He will speculate about the kind of curriculum integration that may lead to an alternative to either academic or vocational education as it now exists.

Debra D. Bragg will speak about the new vocationalism in the context of tech prep. Her comments will be taken primarily from her ongoing policy research on tech prep. Based on the view that tech prep must incorporate elements of integration, secondary/postsecondary articulation, and business and education collaboration, several issues emerge. These include evidence of high schools replacing existing tracks (typically general education or vocational education) with tech prep, weak or limited roles for postsecondary education in articulation relationships, and employer roles that do not extend far beyond traditional vocational education and business arrangements. The notion of creating an approach to vocational education that empowers students to reshape the workplace seems consistent with a tech prep philosophy but is sorely missing in developing tech prep programs.

Richard D. Lakes will focus his remarks on the social and cultural contexts for transitions from school to work. He contends that vocational educators overlook several important assumptions about the social and cultural context for school-to-work transitions. He will explore how in our capitalist economy structural inequities in job distribution and unequal occupational rewards are reproduced in school and in work. Based on his writing and research in critical pedagogy, Dr. Lakes will highlight three concerns: (1) secondary labor markets where new workers are marginalized by class, race, and gender, (2) interactions that occur regularly at work where employees must negotiate social and cultural interactions and accommodate the work setting to survive and be successful, and (3) environments where new workers may resist as well as accommodate inequitable relations of capitalist production.

Penny Burge will discuss the concept of the new vocationalism for special populations with a particular emphasis on gender issues. Based on her research and writing regarding a critical pedagogy for vocational education, Dr. Burge will speculate about approaches to vocational education that can empower students to be active participants in the social transformation of schools and workplaces. The increasing diversity of schools and work, particularly issues raised concerning gender, are central to the perspectives Dr. Burge will raise about the new vocationalism.

L. Allen Phelps will serve as the panel moderator. Dr. Phelps has extensive background in research in vocational education, particularly in the area of special populations. His role will be to facilitate the panel discussion with the researchers and audience participants.

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LANGUAGE FACTORS INFLUENCING LEARNER PROGRESS IN JOB TRAINING PROGRAMS

Jill Sinclair Bell

Faculty of Education
York University
4700 Keele Street
North York
Ontario M3J 1P3
Canada

The research described in this paper was supported by funding from the Social Sciences and Humanities Research Council of Canada, under grant # 884-0031.

Paper presented at the
American Educational Research Association Annual Meeting
New Orleans,
April 1994

Language Factors Influencing Learner Progress in Job-Training Programs

Jill Sinclair Bell

Abstract
This paper describes a study carried out in a pre-apprenticeship program in refrigeration mechanics. Classroom observation was paired with learner interviews to reach an understanding of factors affecting progress in such programs. The paper outlines the patterns of success for these learners, noting the different success rates for various demographic groups. The discussion centers on the implications of language skills for success, and postulates an explanation for the disparate performances based on patterns of early literacy education in mother tongue or second language.

Background to project

The research on which this paper draws is part of a large scale, ongoing research project exploring the experiences of adult learners in job-training programs, with a particular focus on minority group learners. The initial focus of the overall research program was to identify barriers to success for learners who came from minority groups or who had limited English proficiency (LEP). As this article will make clear, the eventual research did not support the notion that LEP or visible minority students experienced greater barriers to success than other students.[1] Consequently, the current focus of the project is to consider language implications for all students.

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[1] The sample of female learners in this study was so small that it is difficult to generalise. However, there do appear to be differences in success rates for this minority group.

The first phase of the research project involved the distribution of a pilot survey (Bell & Goldstein, 1994) designed to identify language and literacy-related areas of difficulty encountered by learners in job-training programs. The survey also gathered demographic information identifying members of minority groups and those who spoke English as a second language. The most striking finding of the survey results was that not only did 55% of second language speakers report language-related difficulties, but that 42% of those who identify themselves as English speakers reported similar concerns.

The second phase of the project involved the researcher participating as student/observer in a pre-apprenticeship technical job-training program in Refrigeration Mechanics to carry out a study of teacher - learner interactions in that setting. As researcher, my intention in this phase was to improve my understanding of the contexts in which job-training programs take place and to build up relationships of trust which would allow me to come to know the learners. At various stages during and after the observation period I interviewed individually 23 of the other members of my class. This analysis of factors affecting learner progress is derived largely from those interviews and from my observations in the classroom. [2]

Profile of the Program

The program in which I participated does not qualify learners as refrigeration mechanics. Rather it is intended to improve the learners' chances of being hired into an apprenticeship position in that field.

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[2] The large-scale project is still ongoing, with current activities focussing on a module-based technical pre-apprenticeship program on the east coast of Canada.

Although an occasional learner will give up employment in order to attend the course, it is designed primarily for those who are unemployed and unable to gain access to apprenticeships through the normal channels.

The 36 week program is taught as six consecutive six-week blocks. The first block provides a basic introduction to electrical work, while the next five blocks deal with the mechanics of refrigeration. Each block is anchored by a refrigeration instructor who provides twenty hours of instruction per week, divided between theory and shop work. In addition, students have from five to eight hours of instruction in support subjects such as small business management, mathematics and blueprint reading, taught by specialists in those subjects. Instructors do not normally remain with the same cohort of students throughout but may teach two or three consecutive blocks before transferring to another cohort.

Data gathering procedures

The course was scheduled five days a week from February to October of 1993. I joined the group one day a week for the first block on electricity, then attended full time throughout the six weeks of the second block which introduced the basics of refrigeration. The class members were aware of my research status and interests, but in all other respects I participated as a regular student fulfilling practical requirements such as constructing piping projects, doing assignments and writing examinations. Field notes were written in all classes, and the majority of the classroom theory sessions in this period were taped and transcribed.

After the intensive participation in Block Two, I continued to attend occasionally for the remaining four blocks, maintaining contact and tracking the progress made by my fellow students until the end of the course. During this period, I interviewed students individually, taping and transcribing interviews in full. I was unable to interview every student in the class, as four dropped out before I was able to do so, and two students declined to be interviewed. There were consequently 23 formal taped interviews from this group, but in addition to this I held numerous informal conversations with every member of the class including all but one of those who were subsequently to drop out.

Learner Profiles

At the start of the program there were 29 learners enrolled. As the figures below indicate, the majority of learners were in their early twenties.

Under 20	3
21-25	12
26-30	7
31-40	6
over 40	1

The requirement for entrance into the program was successful completion of grade 10. Nearly all entrants had in fact completed more schooling than this, with the majority having left school during or after their grade 12 year. Two students had had some University experience and three others had been enrolled in post-secondary college programs. Approximately six had had previous job training in related trades including plumbing, oil burning, and welding .

Three of the students defined themselves as having English as a second language (ESL) - one came from Poland, one from Mexico and one from Indonesia. Eight students were members of visible minority groups; five black, one Filipino, one Indonesian, and one Native American Indian. Of the five black students, one was Canadian born, and the other four came from the Caribbean or Guyana and could be identified as speaking English as a second dialect (ESD). There was one woman in the course. The seventeen remaining students were white English-speaking males.

Most of the students had been employed for some period of time before joining the course. Each student had of course an individual work history of the time between school and University, but we might take one or two fairly typical profiles to get a sense of the kind of backgrounds. Bill[3] had left school half way through grade 12 and had taken work in the shipping department of a company which made cardboard boxes. He was laid off after eighteen months and after a six month gap found another job delivering pizza. When he was laid off from that job, he applied for Unemployment Assistance and was guided towards the college course for training. At age 33, Dave was one of the older men in the program. He had grown up on Canada's east coast and had worked in the fishing industry for a few years, unloading fish from the boats. He had then gone into the construction trade where he had been employed sporadically for a period of ten years doing work such as dismantling scaffolds. A fall from one partially dismantled scaffold had left him with a back injury. His Workers'

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[3] All names used in this paper are pseudonyms.

Compensation counselor had guided him towards the refrigeration course.

Course Instructor

The course instructor, Phil, was a white male in his forties, who had worked in the refrigeration trade for fifteen years before joining the college as an instructor. His background was similar to that of the students in his program in that he had left school after grade 12, and had worked in the parts department of a large automotive chain before beginning an apprenticeship. He did his apprenticeship training in the same college where he is now teaching, and now has as colleagues men who were his teachers. Phil began his teaching career working with apprentices and is now the coordinator of the pre-apprenticeship program. Although he has had no formal teacher training other than a two week in-house introductory session, Phil is widely regarded throughout the college as an excellent teacher who is particularly successful with beginning students who may have some difficulty in getting used to the demands of trade training.

I found Phil's class because my interest in ESL/ minority students had led me to seek out classes where such students were well represented. The perception of various informants in the College was that minority students tend to cluster in the pre-apprenticeship programs where lower formal admission requirements are less likely to screen out those without Canadian qualifications. Because Phil is considered an exceptionally good teacher, he is often assigned to teach the first two blocks (twelve weeks) for each intake to get the students off to a good start. In the course in which I participated, the first three blocks (eighteen weeks) were anchored by Phil and the last three blocks by another teacher. As my participation was concentrated in the early part of the course, my observations are almost entirely based on Phil's classes.

Student Progress in the Program

Of the 29 students who began the program, 17 successfully completed all the blocks and graduated on schedule in October 1993. The eventual success rate is actually higher than these figures suggest, as a key feature of the course is the coordinator's willingness to allow learners who fail a block to re-enroll with subsequent cohorts. (A new intake of students is accepted into the program every twelve weeks.) Five students who failed one or more blocks subsequently repeated the appropriate courses and eventually graduated. Two other students had perhaps an even greater success in that they left the course because they had found work in a directly related field. Only five students actually left the course without receiving their diploma.

Given my interest in the fate of minority students I wanted to see whether they were overly represented in the drop-out rate. This did not appear to be the case. As the table below shows, the LEP and visible minority students had a higher success rate than the majority group students did.

	Start of course	End of Block 3	Completion on schedule	Delayed completion	Total graduating
White English speaking males	17	12	8 (47%)	4	12 (70%)
Females	1	0	0 (0%)	0	0
Visible minority students	8	7	6 (75%)	1	7 (87%)
Students with Limited English Proficiency	3	3	3 (100%)		3 (100%)
Totals	29	22	17 (58%)	5	22 (88%)

Of 17 white English-speaking males who began the course, only 8 (47%) successfully completed it within the normal schedule. Even if we count as successes the two men in this category who left the program because they got work, we still see only a 58% success rate. In contrast, the LEP group had a 100% success rate and the visible minority group had a 75% success rate.

Two possible explanations for this pattern come immediately to mind. The first possibility is that there are barriers to access for minority group applicants, so that the group is under-represented and only the strongest candidates are accepted for the course. This may provide a partial explanation for the high success rate of the LEP learners. Only 10.3% of the learners defined themselves as speakers of English as a second language, in comparison with a city-wide figure of 28.2%. Two of the three men in this group had profiles which significantly increased their chances of success within the field. The

Polish student had completed a degree in mechanical engineering at a Polish university and the Indonesian learner had worked as an air-conditioning mechanic before coming to Canada. The student from Mexico, however, had a background fairly typical of the rest of the class, in that he had had a somewhat checkered career in high school, had left school at 17, and had since worked variously as a carpenter, landscape worker and cleaner. Obviously while the number of ESL users is somewhat lower than might be expected, entry for ESL speakers is not being restricted entirely to those who have prior experience in the field.

Limited access does not seem to provide an explanation for the higher success rate of the visible minority group, in that the proportion of learners from this group (27.5%) is very close to the city-wide figure of 25.8%, suggesting that we have to consider other options.

The second possible explanation for the poor comparative performance of the majority group is that this group encounters difficulties which are not immediately apparent. In an effort to come to understand what those difficulties might be, I asked the students to identify difficult areas of the program, to describe their work study habits, and to identify the kind of teaching which they felt was helpful.

Areas of difficulty encountered

Although a few students reported individual concerns such as shyness when asked to speak up in class, by far the most commonly cited area of difficulty related to literacy-based tasks. The writing demands in the course were fairly minimal in terms of material which had to be submitted to the instructor, although the ability to take good written notes in class would certainly contribute to the learners' success. Perhaps because they only had to write to their own satisfaction, few learners commented on writing difficulties. The reading assignments were regular and fairly demanding, however.

Learners generally claimed that the 1000 page textbook "wasn't bad", but then went on to describe their frustrations in trying to do the assigned readings. One learner commented that the text uses "a lot of complicated words, it could be a little simpler." Dave, the older man from the east coast commented, "I do the reading assignments he gives us and I do the questions at the end, right? Like I'm reading it but my mind is somewhere else. Then when I do go do the questions I got to flip back and go through it all again. That's not bad either, I guess. Probably pick up on it a bit better."

An echo of this came from one of the younger men, who commented that the text book was not very helpful, and elaborated, "I don't know if it's just the words they used, I'm bad with reading. I can read a whole page and be daydreaming about something else and just totally not pick up nothing. I don't know, I just, like, I just don't read or nothing, eh? I don't read books or nothing eh? So that might play a big part in it."

A number of the learners described the need to have some understanding of what a text was about before they could hope to read it successfully. Recent reading research about the implications of schema theory for reading comprehension would certainly bear this out as a key element in successful reading, (Anderson, 1985). However, the learners tended to describe this pattern as a shortcoming in their own literacy skills, rather than seeing it as a basic feature of literacy. Comments in this area included the following.

> "Like some teachers say 'Read the book and then we'll discuss it.' I find it a lot harder. If he discusses it and then you read the book you understand more what's going on."
>
> "Like if I go over it in the book first and then he goes over it, I won't pick anything up. But if he goes over it first and then I go over it in the book, then it's all right."
>
> " I find the text book is a lot easier to understand after Mr. Gibson goes over it. Like I don't really have a hard time reading it, like I might read a paragraph and say, oh I didn't. . . and I have to read it again. But if he assigns a reading and I don't read it and then he goes over it in class and then I read it, then I find it's a lot easier.

One younger student, James, had considerable difficulty with the course and ended up repeating three separate blocks before finally reaching a passing mark. He also had difficulties with the text, though he explained these rather differently.

> "OK. Like the teacher will explain it one way, so you got the way he taught it in your head, and he says 'Read the chapter.' So you go read the chapter and the book says it a different way. So then you got to try to put both of them together to come up with one. So say on the test you put down the textbook way and the teacher wanted it his way, you're going to get it wrong."

This remark suggests that James believes his task is to reproduce not the meaning of what the instructor says, but the specific phrases in which that meaning is delivered. Given this assumption, it is hardly surprising that he finds exams and tests daunting.

A number of learners reported difficulty with the tests and exams, with a number of them asking if the exam couldn't be written in clearer English. One student said "It wasn't that the tests were hard, it was just - when I read them I felt, the way they were worded, I just had trouble comprehending it. " Another commented, "If he asks you plain and blunt what he wants, then I have no problem understanding the question." In response to this concern, the instructor and I agreed to try to modify some of the tests, and a plain-language expert was hired to rewrite the final test for the end of Block Two. Her interventions were largely in the areas such as standardizing the forms in which questions were asked, avoiding passive tenses, replacing vocabulary items with more commonly used words, etc. Space does not allow for a full discussion here of the difficulties encountered in this process, but it became evident that this intervention was far from being an ideal solution. Many of the rewritten questions were not acceptable to the instructor as the meaning had been changed by the rephrasing. Other questions became misleading or overly simple.

Another difficulty related to timing. The instructor normally developed his tests just a few days before their delivery in order to have them accurately reflect the material covered by any given cohort of students. In order to allow time for the plain language expert to do the rewriting, Phil had to develop his test much earlier in the block. Consequently he lost the flexibility to work at the pace which was most effective for that particular class. In the final event, the test scores did not suggest that the plain language intervention had made any significant difference to the learners' performances.

One possible explanation for the lack of success of the plain language intervention was that learners reported particular difficulty with questions which they described as "tricky". The examples they cited were not normally ones which would be considered misleading, but rather ones which diverged from their expectations. For example, in class the instructor had demonstrated a number of problems which involved calculating latent and sensible heat to measure total heat transfer. On the test they were asked merely to calculate the amount of latent heat involved in the process. A number of students did not read the question carefully enough and answered with the amount of both latent and sensible heat. As one young student commented "no matter how simple he can word a question, if you don't read it over carefully enough you're going to miss it anyways." Rather than putting our efforts into rewriting the tests, this suggests that it may be more fruitful to foster the development of careful reading skills.

Although few of the students expressed much confidence in their written skills, they preferred full sentence answer tests to multiple choice. In tests where they were asked to explain in their own words, they had confidence that they could get at least part marks for those aspects of the questions which they did understand. Multiple choice tests , they felt, forced them into right/wrong choices and did not allow for them to demonstrate partial knowledge.

Work Study Habits

One of the most striking features of students who did well on the course was their study skills, in particular their ability to take notes on oral presentations. The theoretical content material in this course was normally scheduled into two or three hour classroom presentations. Phil most commonly used lecture format supported by blackboard diagrams and question and answer sessions to present this material. Material which Phil considered to be of key importance would be written up on the blackboard. However, he covered significantly more information in his lecture than time allowed him to write up formally. Successful students seemed to be competent at taking their own notes from this oral presentation. Less successful students tended to merely copy the blackboard notes and to allow the rest of the material to go unrecorded. One 19 year old student commented to me, "You get four hours of lecture and you come out with half a page of notes." James the triple repeater said "I write down what he writes."

In part, this minimal note taking seemed to come from the learners' difficulties in summarizing what they heard in their own words. Often this implied a lack of understanding on their part. One of the stronger students noted this explicitly. "If I don't quite understand it, I'll put it in his words. But if I understand it, I'll put it in my own words and try to simplify it even further. That way if I go back to it then I'm sure to understand it. " My observations in the classroom suggested that certain students who were experiencing difficulty tended to try to get down every word the instructor said. The format of their questions and their frequent requests for repetition suggested that they were using short term memory to hold the instructor's phrases in their head, rather than chunking the material into meaningful units (Bates et al., 1983; Clark & Clark; 1977; Malt, 1985). Inevitably, as the lecture proceeded, they would fall behind and end up frustrated. By contrast, the more successful students seemed to have developed the ability to decide what was important and to express it concisely in their own words. When asked how they identified what was important, they reported that they used common sense to identify information they might use in the field, mixed with a recognition of cues from the instructor such as repetition.

In describing their study habits, again many of the less successful students commented that they found it difficult to revise for tests using the text book. The majority preferred to rely on their notes, even when those notes were clearly inadequate. Their major pattern of revision was to read over the notes and try to commit them to memory. Some of the successful students followed the same pattern, but a number also reported copying out their notes or writing a summary of them. Those students who reported that they used as revision tools the summaries and comprehension questions at the end of each chapter of the text were also in the successful group.

Teaching strategies which prove helpful

The students in this program were exposed to a minimum of nine instructors in various courses. Many who had had previous job-training experiences had worked with an even wider range of teachers. Asked to identify the most effective teaching strategies, however, they were unanimous in nominating Phil's teaching style as the preferred model. When asked what features of Phil's teaching were helpful, they zeroed in on a number of issues which appear to relate to the literacy concerns addressed above. They stressed that "Mr. Gibson doesn't just read from the textbook." One student compared Phil's oral presentation of material with a previous night school teacher who would "just grab the textbook and just read and everyone would just have to follow along. You would sit there for three hours just following along and along and along. Every so often he would stop and say 'Does anyone have a problem with this?' Everybody would be so confused he'd just keep reading."

In contrast, they pointed out that Phil made his presentation of the material interactive. Mike commented, "It's not so much lecture and then questions - people will stop during the lecture and ask questions. He's good like that, even when you weren't there. Somebody would have questions and if somebody speaks too quietly at the front, he'll say 'Did everyone hear that?' He'll repeat the question in case someone else might have been thinking the same thing, which is good, a good teaching technique." From my observation, Phil took questions at almost any time, including his coffee break and lunch hour. He would frequently solicit questions in class and would regularly remind the group that "There aren't any dumb questions, guys. The only dumb question is the one you didn't ask."

Not everybody in the class took advantage of Phil's willingness to accept questions. Sometimes this was because the students thoroughly understood the material and had no need to ask for further explanation. For others, personality seemed to play a part. James, the triple repeater, was one who rarely asked questions. He said that he found the process difficult because "I find if I explain it my way, I'm going to make it sound like there's two or three answers involved when there's only one. So I got to think about how I'm going to ask the question." He went on to explain that he didn't want to look "like a dummy" in front of his peers, suggesting that this was more important to him than the question of coming to understand the material.

Students also appreciated Phil's clear presentation, particularly his habit of highlighting important areas by writing a set of key notes on the board and giving clear support cues by way of stress and repetition. Commonly, he would make the importance of an item explicit, "Now listen up guys, because this is important. . . " Learners also enjoyed the stories Phil told. Phil often helped them grasp material by recounting problems he had faced as a mechanic in the field or by relating the material to experiences in their own lives. Such stories brought some light relief to the content material but also allowed the learners to bring their background knowledge into play. The abstract material of the text book was transformed into narrative and as such seemed to be more accessible (Egan, 1986, 1988).

The most striking feature of the students' comments on Phil was not directly related to the way he made content material understandable, but to the way he interacted with them as human beings. Over and above all his skill as a teacher, what the students valued was his respect for them, and the way in which he treated them as adults. They found his classroom to be a safe place in which they could relax, and when relaxed they could learn (Daly and McCroskey, 1984).

Overall patterns

If we pull together these preferred aspects of teaching practice and learning situation, it is evident that the students like a teacher who does not make them feel stupid, who welcomes their questions and who is prepared to work interactively. They like the presentation to be primarily within the oral mode supported by pictures and diagrams.

They like to be provided with clearly spelled out notes which help them recognize key features of the material, and they like a presentation style which allows them to relate new material to existing knowledge.

If we contrast this with the situation they encounter when they work with a textbook, we find almost the reverse image. That is, the text tends to make them feel stupid, it does not accept questions and they lack the skills to work interactively with it. The presentation from the textbook is entirely in literate mode, though it does make good use of illustration. The text is not written in a style which can call on their experience and they find great difficulty in relating the new information to their personal practical knowledge, (Connelly & Clandinin, 1988).

Compared in this way, we can see that part of what makes these learners so comfortable in Phil's classroom is that he has found a way to let them achieve at least partial success without needing to have highly developed literacy skills. However, the tests, exams and homework assignments continue to come through the medium of print, and this is the area where those who do not succeed in this course fall into difficulty.

I suggested earlier that the white English-speaking males who had the lowest graduation rate might be encountering difficulties of which we were not aware. Certainly, a significant proportion of these men had literacy difficulties. Where would such difficulties come from, and why did they seem to be more pronounced in the majority group than in the other groups?

One possible explanation lies in the early experiences of language and literacy for these men. All 17 members of this group denied that English was their second language and classified themselves as English speakers. However, deeper probing brought out the fact that although mostly Canadian-born, for more than half of them the language which they first learned was not English. Four had learned Italian as their mother tongue, three Greek, one German and one Maltese for a total of nine men who did not speak English with any fluency before they began in the English-medium school system.

The implications of this for the development of literacy skills are profound. The research in this area suggests very strongly that minority children attempting literacy in a second language are likely to encounter difficulty in their literacy development. Cummins (1981) points out that "minority students born in the host country have worse academic prospects than immigrant students who have had several years of schooling in the country of origin" (p.17). This claim is supported in Troike's (1986) report on literacy patterns in recent Mexican immigrants to the US and in Skutnabb Kangas' (1979) description of the performance of Finnish immigrant children in Sweden.

Hakuta and Snow (1986) agree that minority children who attempt initial literacy in a language other than the mother tongue are at a strong disadvantage which does not appear to be eradicated for a number of years. They find this to be particularly common where the parents do not have strongly developed literacy skills and cannot provide significant home support for the literacy endeavor. I would suggest that this mismatch between home and school is better understood in terms of different cultural patterns of socializing children to literacy, as is considered in my own work with Chinese literacy (Bell, 1991). This position is supported by Farr and Daniels (1986) who write,

> Instruction in literacy for those students who do not come from mainstream culture is partially a matter of acculturation to mainstream culture. Many of the difficulties that such students have in succeeding in becoming literate in school can be explained by the complexity of the differences between their home culture and the school culture (p.31).

Another feature of being schooled in a second language is that while conversational oral fluency may develop fairly rapidly, the language required for full cognitive and academic performance takes much longer to develop, (Cummins, 1981; Cummins and Swain, 1986). For many children the end result is a permanent lag in language skills.

One member of the class, of Italian extraction described this situation exactly. "I remember reading - I was always a little bit behind everybody else. Somebody else was reading at a grade 6 level I was still reading at a grade 2 or 3 level. By the time we got up to that part I was always taking a different English class than everybody else. " Another man of Greek background said, somewhat defensively. "I could read - it's just that it took me a little longer." Over and over, in talking to the men in this group, I heard that class members had failed grade one, or had been put into remedial English classes, or had "never been good at reading". The pattern seemed to have continued into adulthood. Few of the learners in the class felt comfortable about their literacy skills and with the exception of one who read the newspaper, none of them read for pleasure. Ron commented, "I don't like reading, I never did. My wife can read a novel but I don't read. " Young James summed it up for most of the class, "I only read what I gotta read, really. "

In summary then, the so-called English-speaking group includes a number of men whose mother tongue is not English. Many in this group report that they had difficulties with initial literacy and the majority still feel that their literacy skills are inadequate today. Does this account for the poor relative performance of this English-speaking group? It might be helpful to look at the progress patterns a little more closely.

n=17	**Completed course on schedule**	**Completed course with delay**	**Found work**	**Dropped out**	**Total**
English as mother tongue	4 (50%)	0	1 (12%)	3 (37%)	8
Mother tongue not English	4 (44%)	4 (44%)	1 (11%)	0	9

From the table, we can see that those who learned literacy in their mother tongue, English, either completed the course successfully or dropped out entirely. Those who did not have full English proficiency split in a different pattern, with approximately half achieving success in the scheduled time frame and half needing to repeat courses.

The research on initial literacy acquisition and transfer of language and literacy skills to a second language suggests that those who learned initial literacy in a mother tongue other than English will, if given sufficient exposure to English, be able to transfer those skills over to English and perform with greater success than those of non-English speaking backgrounds educated entirely in English. If this is true, we would expect that Polish speakers introduced to literacy in Polish, Spanish speakers introduced to literacy in Spanish, etc., would perform in a manner comparable to the English mother tongue speakers. If we apply this grouping pattern to the entire class of 29 people, we can see that this does indeed appear to be the case.

n=29	**Completed course on schedule**	**Completed course with delay**	**Found work**	**Dropped out**	**Total**
Initial literacy in mother tongue	9 (64%)	0	1 (7%)	4 (28%)	14
Initial literacy in second dialect	4 (66%)	1 (16%)	0	1 (16%)	6
Initial literacy in second language	4 (44%)	4 (44%)	1 (12%)	0	9

The group educated in their mother tongue have the highest success rate, at 64%. The group who spoke a dialect version of English, and who had to learn to read and write standard English show a comparable pattern (66%) with one student needing to repeat certain courses. Those who learned initial literacy in a second language show the weakest performance at 44%.

Although mother tongue literacy seems to increase the chances of success, it is obvious from the clustering of drop-outs in this group that it certainly is not a guarantee. Of the five people who left the course with neither a job nor a diploma, four had English as their mother tongue and one had standard English as a second dialect. The student from the Caribbean left so early in the program that I had no chance to find out what his reason was. Another drop-out was the female student who in fact had excellent literacy skills. She scored highly on all written tests but failed certain shop tests such as welding. She was offered the opportunity to repeat the shop courses but decided instead to transfer into a business studies course in another college. The older man from the east coast had trouble with his injured back and found it difficult to make up his frequent absences. The other two drop-outs were young men of 19 who found the course difficult and could not seem to settle back into the routine of school. It was noticeable that the last three had difficulty with literacy based tasks-reminding us that not all literacy problems come out of a second language education.

Conclusions

Successful performance in job-training programs undoubtedly calls for adequate literacy skill development, particularly in areas such as note taking, reading expository text and answering examination questions appropriately. These skills go far beyond mere decoding and encoding of text. A significant number of the learners who encountered difficulty in this program demonstrated poor literacy skills and interventions such as plain-language tests were insufficient to overcome these problems. Obviously there is a place in job-training for the development of higher order literacy skills, but time constraints will obviously limit what can be achieved in this area. It may be that we have to consider teaching strategies which support the existing literacy skills learners have.

Of the learners enrolled in the program under study, a significant number from second language backgrounds demonstrated limited literacy skills. There is, of course, no hard evidence to link the literacy levels that these men describe to their patterns of language acquisition as youngsters. However, the patterns of performance among this group make it seem worth considering teaching methods developed with second language learners in mind. It may be that we need to consider a much larger number of adult learners as having second language challenges than are currently labeled in that fashion, and adjust our teaching methods accordingly to address this need.

Phil, it appears, by working within a primarily oral and context embedded mode has found a way to work to the language strengths of these men while giving them a degree of comfort within the classroom. The methods which work for the weaker students in his class, also seem to be acceptable and popular with the stronger students, suggesting that good teaching for those with literacy difficulties is good teaching for all learners.

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STUDENT OUTCOMES ASSOCIATED WITH THE INTEGRATION OF ACADEMIC AND VOCATIONAL EDUCATION

Curtis R. Finch
B. June Schmidt
Susan L. Faulkner

Virginia Tech Office
National Center for Research in Vocational Education
Division of Vocational and Technical Education
Virginia Polytechnic Institute and State University
Blacksburg, Virginia 24061-0254

The research reported herein was performed for the National Center for Research in Vocational Education, University of California, Berkeley, pursuant to a grant from the Office of Vocational and Adult Education, U.S. Department of Education. However, the opinions expressed herein do not necessarily reflect the position or policy of the U.S. Department of Education, and no official endorsement by the U.S. Department of Education should be inferred.

Paper presented at the
American Education Research Association Meeting
New Orleans, LA
April, 1994

STUDENT OUTCOMES ASSOCIATED WITH THE INTEGRATION OF ACADEMIC AND VOCATIONAL EDUCATION

Curtis R. Finch, B. June Schmidt, and Susan L. Faulkner

OVERVIEW

In recent years, there has been a groundswell of activity related to the integration of academic and vocational education. Initially stimulated by demands for educational reform and concern about the changing needs of workers in business and industry, integration received its greatest boost from the Carl D. Perkins Vocational and Applied Technology Education Act of 1990. Since the Perkins Act mandated academic and vocational education integration as a prerequisite to receipt of Federal funds, numerous localities across the United States have begun the complex task of implementing integrated curricula and instruction in their schools.

Fortunately, several research studies have been conducted that provide local school personnel with a clearer view of what integration is and can be and ways that it may be implemented. For example, National Center for Research in Vocational Education (NCRVE) researchers have documented various integration models that exist (Grubb, Davis, Lum, Plihal, & Morgaine, 1991), relations between vocational and academic education faculty that facilitate or hinder integration efforts (Schmidt, 1992), the comprehensive high school as a context for integration (Little & Threatt, 1992), and the extent to which integration's objectives are being met (Beck, Copa, & Pease, 1991). These studies, and others, have provided educators with a wealth of valuable information related to initiating integrated programs.

As the establishment of integrated programs continues to take place across the United States, administrators, teachers, counselors, and others are beginning to raise significant questions about integration and it's outcomes. These include questions such as "What are integration's real benefits?" and "When will we know how much integration helps our students?" In reality, little information is available to help answer these questions. The link between integration and student outcomes remains largely undocumented. These integration-related outcomes, which have been described by Finch, Schmidt, & Faulkner (1993, 11) as "the desired changes that should ultimately occur in schools where academic and vocational education are integrated," reflect the student gains that educators and others hope to observe.

This study had as its objective the identification and documentation of student outcomes associated with integration. More specifically, we sought to identify student outcomes associated with integration in the schools and organize these outcomes into meaningful themes.

METHOD

This particular research built upon a multi-year NCRVE field study that focused on teachers' roles in the integration of academic and vocational education (Schmidt, Finch, & Faulkner, 1992). From schools nominated as being active and successful in the integration of academic and vocational education, 10 secondary school sites located in 10 different states were selected to be visited. During each visit, face-to-face interviews were conducted with administrators, academic and vocational teachers, and counselors. As a part of the interview process, each person was asked to recount at least one student outcome related to integration. Interviewees were also asked to describe two events related to integration. One event focused on a specific time when the interviewee and others were particularly effective at integration, while another event focused on a different time when the interviewee and others would, due to hindsight, change what had been done. The interview process was patterned after the behavioral event interview technique (McClelland, 1978). Audio-taped interview transcripts were examined using ethnographic procedures designed for analysis of text-based qualitative data. Based on the analysis, six themes associated with integration emerged: cooperative efforts, curriculum strategies, instructional strategies, administrative practices and procedures, teacher outcomes, and student outcomes.

The analysis also served as a starting point for creating a conceptual framework that describes teachers' roles in integration. Essentially, cooperative efforts, curriculum strategies, and instructional strategies that engage academic and vocational teachers in integration may be considered as cumulative with each aspect of the integration process contributing to the next. Administrative practices and procedures contribute to integration success through facilitating, communicating and assisting, and supporting activities provided by administrators and others . Collectively, these four themes contribute to both teacher outcomes and student outcomes (Finch, Schmidt, & Faulkner, 1993, 9-11).

Recognizing the importance of student outcomes and concerns school administrators and teachers have about student outcomes for integration, we conducted a detailed analysis of this area. Our analysis focused on possible subthemes underlying the student outcome theme and groupings of student outcomes based on examples provided by the interviewees.

RESULTS

Examination of the student outcomes theme focused on links between the integration process and student improvement and/or success. In this instance, outcomes information was drawn from the two events provided by each interviewee. No direct requests were made for student outcomes information. The six subthemes that emerged from the student outcomes theme included (1) performing a task better, (2) transferring learning, (3) making better grades/passing a class/staying in school, (4) approaching learning through application, (5) becoming more competent or proficient, and (6) accepting vocational/academic programs.

Performing a Task Better

Students were often able to perform tasks better as a result of the integration process. A business teacher recognized the benefit to students when she worked with English teachers on a term paper project:

> The English teachers and I have a good working relationship. And it is so much easier for students to do a term paper on a computer than it is to sit down at a typewriter. The students have worked very well with all the teachers. In terms of benefits to students, they do not get as frustrated with the term paper preparation task. For example, when a student gets down to the bottom of the page using a typewriter and makes a mistake that cannot be corrected, it is much more frustrating than when a computer is used to correct the mistake. Instead of learning more about the mechanics of a typewriter, students can concentrate on learning about writing a paper.

A principal emphasized the benefits for a student to produce a high quality paper when four teachers worked together:

> The student benefited from having input from four teachers on a single project rather than just having input from one teacher. By the English, biology, agriculture, and computer teachers all helping the student with the same paper, the student was able to be more focused and to produce a higher quality paper than he would have if each teacher were requiring him to do something different.

Transferring Learning

Through exposure to integrated instruction, students were able to transfer their learning across several classes. A math teacher talked about students transferring their learning from health occupations class to a math class:

> The health occupations teacher and I integrated an activity to study diabetes. I had some students in my math class that had already studied diabetes in health occupations. So, when I presented diabetic material to my class, the students who already studied the subject got real excited. The students from the health occupations class started teaching the other students. Then, a diabetic student actually showed

> the other students how she took care of herself. For example, she showed the students how she tested her blood, how to cheat, and how to give herself an injection.

Another math teacher said that her students were able to relate the mathematical concepts she was teaching to their vocational classes:

> When teaching the applied math, I find that my students often mention that they can relate to what I am teaching because of what they have learned in auto mechanics, principles of technology, or agriculture classes. I like to hear that my applied mathematics course is relevant for the students.

A health occupations teacher told of how her students were better able to understand medical information and relate this information to real world situations after teaching a unit on medical terminology:

> I feel this activity has been good for students. Now, when the students read the newspaper or watch television, they know what the medical terms mean. In fact, I have students tell me about watching television and understanding the medical terms. For example, the students understand about the President's medical problems due to knowing the meaning of the medical terms printed in the paper and talked about on television.

Making Better Grades/Passing a Class/Staying in School

A fairly common student outcome was that integration activities helped students make better grades, pass a class, or stay in school. A counselor referred to a student who was able to graduate because a physics teacher taught the student in an applied fashion:

> One student had failed a required course in his senior year and had to return for a fifth year to graduate. He wanted to take the physics course even though he really did not have the prerequisite skills for it. The physics teacher, however, agreed to have the student in the class

> and to help him. What the physics teacher did was use teaching techniques from the Principles of Technology class, which he team teaches with the auto mechanics teacher, to make the physics instruction relevant to the student. The teacher used techniques and concepts from vocational classes to help the student. The techniques included applied laboratories, workbooks, and so forth to motivate the student. As a result, the student passed the physics class and graduated from high school.

An electronics teacher told of how he worked with a math teacher to help students stay in school:

> The math teacher was very, very helpful. He would teach the concepts from the academic perspective, not the shortcuts, and this worked out extremely well. The math teacher and I saved quite a number of students who would have, in all probability, either dropped out or flunked out of the electronics curriculum because their math skills were just not adequate.

At one school site, vocational and academic teachers worked together on a drop-out prevention team to help students stay in school. One teacher commented:

> The common planning time allowed the dropout prevention team members to discuss student problems and to devise ways to help students without the teachers having to resort to discipline referrals. I was proud and happy with the results of the team efforts. More than ninety percent of the students in the team's school within a school effort did not drop out. The success of our integrated activities went beyond our expectations.

Approaching Learning Through Application

Students responded to learning material that was made relevant. A drafting teacher explained how he made writing assignments relevant for students, as follows: "The portfolio assignment has been very successful. Writing just to be writing does not work for the students. If students can see some value in writing, they will do it without question."

At another school site, a principles of technology teacher worked with a math teacher to teach math through application:

> The math teacher and I have worked together and almost eliminated the question in Algebra I classes of "Where will we use this?" For example,after the hands-on exercise about ordered pairs, most of the students did not need the lecture on the concepts involved. They already understood. One particular student, who normally has trouble with math, really did a good job with this activity. This student understood the concepts. I think this student caught on fast because we actually gave him the hands-on learning. Apparently, the math makes more sense to him now because he knows how to use it.

An electronics teacher said that he had worked with a math teacher on making the math more relevant for the electronics students:

> The math teacher has noticed that by doing math on a more informal basis in the electrical construction laboratory, he has led a lot of students to take the higher level math because the students are not afraid of math anymore. The electrical construction students can see some relevancy between learning mathematics and what they are going to be doing in the trade area.

A principal relayed that the English and metals teachers worked together to teach indexing through practical applications:

> I feel that the students were receptive to learning indexing because the English taught in this module was made practical. A lot of students have worked with indexes in English classes, but they have never worked with indexes in a metals laboratory. The metals teacher feels that students, who have not learned English in the past and were thought to be slow, can now learn the information through practical application.

Becoming More Competent or Proficient

The integration of vocational and academic education appeared to assist some students in becoming more competent or proficient. A math teacher, who taught masonry students math skills needed to estimate materials, provided the following comments:

> One of the students from the masonry class approached me outside of class. He was almost to the point of gloating. He was so pleased with himself. His father is a mason and the student had gone home and calculated the same problem he had done in class and showed his father how he had learned to estimate materials. The student quoted his father as saying "You have learned in two weeks what it has taken me years of practical experience to learn." The student felt at that moment that he knew as much as his father. He felt successful and good about himself. This was a student who was not an achiever or honor roll student. He just barely gets by. I felt great about this success and that I had done some good. The masonry teacher was also very pleased. When we get a student feeling that good, you know you have given him motivation. We felt that we were doing something right.

A principal at a different school site talked about a student becoming proficient in math:

> A student enrolled in the high school with parents who were college graduates was a fun person to be around, but academically he was just not really involved in his studies. The student was, however, involved in the vocational agriculture program and FFA. This student was one who said "I can get by." During the second semester of last school year, the mathematics teacher, who was teaching this student applied mathematics, came to me and said this student was all of a sudden excited about the mathematics instruction. Because of the applied math course, this student ended up being enthused and has begun to go beyond just getting by.

A remedial math teacher discussed working with the remedial vocational teacher to help students become more competent in math:

> Once the remedial vocational teacher and I identify students that have problems with math and are really trying, then those are the students I want to concentrate on to help reach the ninety-five percent level on the math test. Some students may never score at the ninety-five percent level, but they are learning through the program. By the end of the school year, the remedial math teacher and I typically have well over fifty percent of the students scoring ninety-five percent or above,

> whereas we start the year with maybe one or two students scoring ninety-five percent or above.

Accepting Vocational/Academic Programs

Through working with both vocational teachers and academic teachers, students learned to accept the importance of information taught in these two areas. A principal had a conversation with parents of a vocational student who realized the importance of math:

> The student's parents indicated to me that the class and the teacher made the difference and that the student had decided academics and grades were important. The student is having a little trouble in an English class this year but he now wants to go on to college. The parents indicated that their son had no thoughts about going on to college until he took the applied math class. The student said that for the first time he had a reason for studying math and other academic subjects.

An electrical teacher explained that when students first came to the vocational school, they did not realize the importance of having math skills:

> When math was first brought to the electrical construction laboratory, the students thought it was a pain, just something more that they had to worry about. The students came to the vocational school to learn electricity, not to sit in a classroom doing math problems.

Students did not always accept vocational/academic classes. An English teacher felt that students were not accepting of the English classes because of a vocational teacher's attitude toward English:

> In English, the curriculum requires that I teach English literature to junior and senior students, something that they are particularly negative about. By the time students are juniors and seniors, they seem to have had so many negative and nonrelevant experiences in English that they are really resistant. Resistant to the point that many of them do not do the required work in English. The vocational teachers could be a tremendous help. However, many of them do not have adequate English skills themselves, and they do not require

> students to write in their classes. In fact, one of the vocational teachers has told the students he has never read a book even though he is a college graduate. This reinforces the disrespect students have for English. This type of comment creates a real split between vocational and academic education.

Examples of student outcomes provided directly by interviewees offered a somewhat different view of student outcomes. In this case, each interviewee responded to a direct request for "a specific example of student success as an outcome of vocational and academic teachers' efforts to integrate vocational and academic education" (Schmidt, Finch, & Faulkner, 1992, 109). The examples could be organized into two different clusters consisting of (1) student success in school, and (2) success beyond high school.

The cluster focusing on student in-school success tended to parallel the previously described student outcome subthemes and included examples such as students becoming more confident, developing more positive attitudes toward education, and improving academically. We noted that, regarding this cluster, it was sometimes difficult to separate greater student self-assurance from greater academic success. In other words, some examples included both greater self-assurance and academic success.

In this respect, a teacher commented that by using integration to assist a student who was not working up to her potential feel special, the student began to increase her confidence and her math skills improved. A counselor in another school discussed a student who was enrolled in the school's business academy:

> He had no self-esteem at the beginning of his junior year. Through the activities that the teachers have been doing, he won the academy student of the month [award]. They have been working with him and I know that he seems to be more self-assured. His grades have improved.

Several examples were provided about the impact of applied courses. A principal at one school commented:

> We have several kids that have been turned around by applied math. We had low scoring students who became involved in the math and have become more involved in their studies. Eleven of our twenty-two students in the class last year basically turned around.

An administrator at another school provided an example of a student who had taken an AP physics course and then decided to enroll in a Principles of Technology course. Later, the student came to the administrator and said "It finally makes sense. I knew all the theories and now I know how to use physics."

An administrator at a third school presented examples of a two students, one of which was classified as special education:

> He (the special education student) had a B average in the class. The difference is the hands-on learning which relates to math. It's not a watered-down course. We also have a student with a 4.0 who went through principles of technology. He then took advanced physics. He stated that the principles of technology helped him with this class.

It was additionally noted that changes occurred in students' attitudes toward courses. Focusing on changes in students' feelings about an English course, an English teacher stated:

> I have students who come to me the first day of school and tell me they hate English. They tell me at the end how they love how it is integrated with the shop.

Additionally, activities of teacher teams appeared to contribute to student success. An academic teacher commented on the success of teacher teamwork:

> We had three classes which were block scheduled: marketing, biology, and English. Those three teachers had a common planning period. Several students would not have graduated on time, but because of the work of these teachers and after-school classes, the students will now graduate on time.

Although interviewees provided fewer examples of success beyond high school, this cluster was most valuable since it touched on outcomes that were not identified in the student outcomes subthemes. Several examples consisted of testimonials about former students who succeeded in the workplace. For example, a counselor noted:

> We had a graduate last year who excelled in the ability to program on

A academic teacher in a third school provided a different business academy success story.

> One of my young men who had not done well academically his freshman year progressed greatly by his senior year and he got a job with a bank. One of the men from the bank came to give a presentation on savings and loans and stressed the importance of careful investing. He said that the young man who worked with him had one of the best attitudes.

In summary, the examples of student in-school success seemed to parallel student outcome subthemes. However, examples of success beyond high school clearly went beyond these subthemes. Examples in this second cluster provide some support for the inclusion of integration outcomes that extend beyond school and into the workplace.

DISCUSSION

The study results provide researchers with a basic set of student outcomes associated with integration that can serve as starting points for the examination of cause and effect relationships in the integration process. Additionally, student outcomes identified in this study should be of value to administrators, teachers, counselors, and others in the schools who are seeking answers to questions about integration's benefits.

Also of value is the notion of school-related and work-related outcomes. Our examination of integration events provided by interviewees resulted in the identification of numerous school-related student outcomes but no work-related outcomes. However, when interviewees were asked to give specific examples of student success, they provided both school- and work-related outcomes. Persons who plan to gather outcome information of this type in the future should consider using both unobtrusive and direct approaches to obtain data. This may result in the identification of a more comprehensive set of outcomes.

And finally, we had hoped to generate enough outcome information to draft a taxonomy of student outcomes associated with integration. Unfortunately, this did not occur. The list of outcomes is useful but may not yet be complete. We are, of course, optimistic that future research will provide a more complete listing; one that can be transformed into a taxonomy of outcomes.

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Attitudes Toward Math and Science Courses and Problem Solving Tasks Among Socially-Oriented Secondary Vocational Students

Robert L. Fritz
Department of Occupational Studies
The University of Georgia
Athens, Georgia 30602

Paper presented at the
American Educational Research Association
New Orleans, GA
April 4-8, 1994

Running Heading: MATHEMATICS, SCIENCE, AND PROBLEM SOLVING

ABSTRACT

Secondary students with a social learning style are so designated because their personality and cognitive structures orient them toward courses and occupations that reinforce their automatic social orientation. To help them develop high performance and high wage job skills, vocational programs must cultivate these patterns and the enduring motivation that students need to become experts in disciplines that call for working with people. What this in mind, this study examined the interests that socially oriented vocational students have in mathematics, science, and problem solving tasks. The finding of consistency between personality, cognitive, and interest patterns was consistent with expectations predicted by theories of vocational development, personality and cognitive style.

INTRODUCTION

Some states, including Georgia, have increased mathematics requirements in secondary schools too, along with science, improve reasoning and problem solving skill and to prepare students for higher job standards. Yet, many years ago, it was recognized that the key to improved mental ability is with the processes of instruction more than course content (Cronbach, 1963; Tanner & Tanner, 1990). According to Snow (1987), successful performance on complex and demanding tasks is mostly a product of readiness for learning. He also contended, as have others (Holland, 1985; Witkin & Goodenough, 1981), that the personality and cognitive structures that satisfy readiness criteria evolve early in life to have an impact by late high school years on course preferences and how people solve complex tasks. Among most marketing education students, Fritz (1993) found cognitive traits that suggest a social learning style and low readiness for advanced mathematics and science coursework. As an extension of that work, this study determined the attitudes of marketing education students toward mathematics, science, marketing education, and problem solving tasks.

The most fundamental reason for doing this was to expand what is known about the social style learner in a vocational context. Witkin and Goodenough (1981) described this style as having a strong interpersonal orientation and limited interest in or readiness for cognitive tasks. Social style learners have good interpersonal and communication skills, prefer a social learning context, and seem to enter careers that have a with-people orientation. Fritz (1981, 1993) reported that students with this style seem to enroll in secondary home economics and marketing education programs.

Beck (1991) and Schmidt (1992) saw the need for studies like this as ways to deepen knowledge of learning in vocational education. As some point, knowledge from these studies can help fine-tune insights about the learning conditions that people need to develop advanced process and content skills. This is currently the case with the charge to improve reasoning and problem solving skills beyond what can be predicted by socio-economic status.

A three-part theory base was used to explore this topic. Holland's (1985) congruence model is the dominant frame. It suggests that, as they progress through teenage years, people are increasingly motivated by their own interests, in part because of an increasingly stable and focused personality orientation. When added to field-dependence theory (Witkin & Goodenough, 1981), the impact of stable cognitive structures, which likely emanate from personality, could have an impact on learning preferences when tasks become complex and demanding. By the junior year of high school, when both personality and cognitive patterns stabilize, it should not be surprising that students start to look for programs that reinforce their more consistent basic orientation toward life. When related to Bloom's (1984) concept of higher-order problem solving at the application level, then, the role of congruence is revealed by the way that a preferred environment could affect how students develop complex skills.

Students who lack the abilities and interests required by a task setting could have an inaptitude (Cronbach & Snow, 1977), particularly if successful performance involves a specific personality and dispositional pattern. With regard to malleability, some researchers doubt that the underlying frames of reference in a personality can be modified (Holland, 1985; Messick, 1987; Witkin & Goodenough, 1981). This is important because the personality and cognitive pattern that seems best matched to advanced problem solving requirements has an analytical orientation: It includes a positive interest in cognitive tasks, an independent problem solving orientation, and the ability to restructure or manipulate information in the minds eye (Witkin & Goodenough, 1981). This pattern differs from the one typically found in marketing education (Fritz, 1992). It is noteworthy that Bruner (1990) questioned the propriety of trying to alter personality patterns for economic reasons, if doing it would cancel the impact of valued family and reference group traditions.

While higher job standards put more value on cognitive skills, and emerging workforce conditions mean that more students need this orientation, it is still likely that problem solving skill reflects what people need in everyday life and the conditions that are reinforced by socio-economic status (Kagan & Lange, 1978; Witkin & Goodenough, 1981). Thus, to develop complex skills that are not predicted by some factor, educators need to know how task demands relate to personality and cognitive orientation, because the congruence or lack there-of has implications for application-level problem solving. At this level, Bloom (1984) noted that students must demonstrate an important cognitive skill, the ability to restructure knowledge. Restructuring involves the independent reorganizing of a new problem into familiar terms and the selection of appropriate principles or concepts to develop a solution. To demonstrate restructuring skill, people *must* work alone.

They must decide how to connect a problem to an abstraction -- a principle, method, framework, or theory. The ability to make these connections is what constitutes restructuring skill. Those who can not make these connections, such as many social style learners, suggesting that they would not be predicted to meet the expectations in application-level cognitive problems.

Limited research indicates that students with good restructuring skill tend to enroll in programs that call for these skills -- math, science, technology-based programs (Fritz, 1981; Holland, 1985; Witkin & Goodenough, 1981). Students who have limited restructuring skill are likely to choose programs that have people-centered course content -- marketing education, home economics, and the social studies (Fritz, 1981, 1989; Witkin, Moore, Goodenough, & Cox, 1977).

According to Witkin and Goodenough (1981), the personality and cognitive patterns that people develop early in life have an automatic and sometimes unconscious influence on preferences. Once these patterns are stable, if incongruence means that students need new cognitive skills, there is a possible assumption that they may also need a modified personality pattern in order to meet the behavioral demands in complex tasks. Because these attributes may be grounded in everyday social conditions (Kagan & Lange, 1978; Witkin, 1978; Witkin & Goodenough, 1981), they may not be easily changed.

Holland (1985) suggested that people often lack sufficient reinforcements to sustain a major personality change. Thus, if problem solving style is an extension of personality (Messick, 1987), appropriate skills may be difficult to supplement unless supported by a nurturing environment that differentiates content and process skills. Consequently, what students think about problem solving, mathematics, and science courses could be an important reflection of personality and cognitive orientation.

Thus, to develop new and perhaps different skills, instruction may have to account for existing personality and cognitive foundations. To improve reasoning and problem solving skills and to prepare for higher jobs standards, teaching and learning must address both the process and content factors that students must acquire. They must also establish the role that a supportive curriculum framework could play in the development of enduring motivation and independent interests.

While curriculum reform has emphasized technology and its underpinnings in mathematics and science, an effective pedagogy for the social-style learner is also needed, even though it could be very different. This is so because the service sector, and not production, is likely to attract people with this style. The vocational options in this field, as with the former, should foster high performance and high wage employment. So far, this arena has been conspicuous by its absence from reform. To change this situation, though, instruction must account for developmental traits that orient students toward and against learning environments and that teach the processes that develop complex and demanding skills, like those in application-level problem solving.

Kagan and Lange (1978) believed that youths acquire their problem solving skills quite normally through experiences in everyday life. If they lack role models or reinforcements, students may not acquire the foundations they need to develop complex skills, including the restructuring skills that are needed for application-level problem solving. While Marshall and Tucker (1992) indicate that socio-economic status tends to correlate to good problem solving skill, Fritz (in preparation) found that nearly 80% of the secondary marketing education students in central Georgia have parents with high school or lower levels of educational attainment. The jobs held by many of these parents, which were often in the clerical and retail trades, seem not to require restructuring skills. Thus, many of these adults may have limited restructuring skill, as could be predicted by these patterns of everyday life.

Overall, good restructuring skill is less likely to be found where there are high concentrations of poverty or intrusive social conditions (Ginsburg & Opper, 1978; Kagan & Lange, 1978; Witkin & Goodenough, 1981). In addition, females, more than males, are likely to have low or limited restructuring skill (Ginsburg & Opper, 1978; Witkin & Goodenough, 1981).

In sum, then, there is strong evidence that social style learners in vocational marketing education have a personality and cognitive orientation that may be incongruent with the content interests and process demands associated with advanced mathematics, science, and problem solving tasks. Until now, though, these students have not been specifically asked to indicate their attitudes toward these issues.

Problem and Objectives

The 1990 Carl D. Perkins Vocational Education and Applied Technology Act placed an emphasis on revitalized vocational programs. One of its goals is to improve student's problem solving skills. At the same time, some states, including Georgia, increased math and science requirements. Because congruence theory (Holland, 1985) and field-dependence cognitive style theory (Witkin & Goodenough, 1981) promote the idea that people relate to tasks through their personality and cognitive structures, there is a need to identify the attitudes that students have toward mathematics, science, marketing education, and problem solving. Based on that belief, this study sought to answer these questions:

1. Do secondary marketing education students have the restructuring skills they need to solve application-level cognitive tasks?
2. Based on gender, what are the attitudes that secondary marketing education students hold toward mathematics and science courses?
3. Based on gender, what are the attitudes that secondary marketing education students hold toward higher-order problem solving tasks?

This study concentrated on secondary vocational marketing education students because they met two important criteria. First, the program has a with-people curriculum and tends to enroll students who have a social learning style. Second, many marketing education students do not seem to take elective math or science courses. Thus, there seemed to be a higher probability that the data obtained from these students would suggest congruence between the personality and cognitive structures of these students and their educational preferences.

Research Method and Procedures

The entire enrollment in the marketing education programs in three central Georgia schools were tested during the spring of 1992 as in-tact groups. Restructuring skill was measured with the Group Embedded Figures Test (GEFT) (it has satisfactory validity and reliability .82) (Witkin, Oltman, Raskin, & Karp, 1971). Scores range from 0-18 -- 0-3 indicates low restructuring skill and 15-18 high restructuring skill.

In addition, a self-report inventory developed by the researcher was used to assess attitudes toward problem solving and mathematics and science courses. Both open and closed end items were used. Zytowski and Borgen (1983) indicate that self-reports and expressed interest are trustworthy methods to examine congruence and incongruence. "The evidence suggests the typical worker or career client can do a credible job of self-appraisal" (p. 25). They recommend that self-descriptive data be compared to formal test data, as was done in this study.

The sample consisted of 239 students, 150 were female and 88 male. In addition to descriptive statistics, the *t*-test for independent samples was used, along with cross tabulations. These methods are consistent with prior research of this type. First, it was determined that no statistical differences in GEFT scores existed among schools or based on years enrolled in these programs.

Standardized procedures were used. Students first completed the Group Embedded Figures Test because it is timed. Then they completed the self-report on attitudes toward mathematics, science, marketing education, and problem solving. They also provided demographic data about sex, age, race, and grade-level.

Findings and Conclusions

For question one, Table 1 indicates that about 31.9% of the GEFT scores were between 0-3 and 60.9% of the students scored between 0-7. This revealed low to moderate restructuring skill. With reference to application-level cognitive objectives, this data suggests that this group of students may need developmental and supportive instruction to learn how to restructure tasks as Bloom (1984) associated them with the application level in the cognitive domain. Only about 5% scored between 15-18. ($\underline{M}$ = 7.025; Median = 6.00; Mode = 1.00 and $\underline{n}$ = 24).

Table 1
Distribution of GEFT scores

Score	Frequency N = 239	Percent	Cumulative %
0	16	6.7	6.7
1	24	10.0	16.8
2	19	7.9	24.8
3	17	7.1	31.9
4	20	8.4	40.3
5	18	7.5	47.9
6	17	7.1	55.0
7	14	5.9	60.9
8	11	4.6	65.5
9	12	5.0	70.6
10	13	5.4	76.1
11	11	4.6	80.7
12	9	3.8	84.5
13	7	2.9	87.4
14	8	3.3	90.8
15	10	4.2	95.0
16	2	.8	95.8
17	5	2.1	97.9
18	4	1.7	99.6
Missing	2	.8	100.0

Because the program has a people orientation, though, the tenor in the finding for this question seems to match expectations from congruence theory (Holland, 1985). Students with a social learning style would be expected to enroll in marketing education and to lack restructuring skills needed for application-level tasks.

For the second question, it was first determined that there was a statistical difference in group GEFT scores based on gender, with females have a lower restructuring mean (GEFT M = 5.95) than males (GEFT M = 7.91). Thus, gender was used as a categorical variable even though the real differences between the means was narrow and below the mid-point on the GEFT range.

Table 2

GEFT t-test for independent samples

Group	n	Mean	St. Dev.	F	t Value	d.f	2-Tail
Females	150	5.9467	4.567	1.30	3.03	235	.003*
Males	87	7.9080	5.200			p <.05*	

Next, though, it was determined that there were no statistical gender differences in attitudes toward advanced mathematics, science, and marketing education courses (Table 3). The data suggested gender agreement on courses to avoid. For example, 54% of females and 56.3% of males wanted to avoid mathematics. For science, 36% of females and 41.3% of males indicated a desire to these courses. For marketing education, 7.9% of females and 10% males indicated a desire to avoid it in the future. The most common reasons to avoid courses were because they were "overly difficult" (56.1% of females and 50% of males) and "don't like it" (22.3% of females and 17.5% of males). Another category, "irrelevant" was checked by 10.8% of females and 15% of males. These

Table 3

Cross-tabs: Avoid Math, Science, & Marketing Education

	Blank		Yes		
	Exp. Value	%	Exp. Value	%	n
Avoid Elective Mathematics Courses					
Females	62.8	46.0%	76.2	54.0%	139
Males	36.2	43.8%	43.8	56.3%	80
Chi Sq Pearson Value = .10780 df = 1 Sign.= .74267					
Avoid Science Courses					
Females	86.3	64.0%	52.7	36.0%	139
Males	49.7	58.8%	30.3	41.3%	80
Chi Sq Pearson Value = .60117 df = 1 Sign. = .43813					
Avoid Marketing Education					
Females	126.9	92.1%	12.1	7.9%	139
Males	73.1	90.0%	6.9	10.0%	80
Chi Sq Pearson Value = .27895 df = 1 Sign. = .59739					

categories were created from open-ended responses. The personality correlates for frustration tolerance, persistence, self-control and interest could be reflected in these responses.-Table 4

Open-ended Responses: Reasons to Avoid Programs

	Females n = 139	Males n = 80
Overly Difficult	56.1%	50.0%
Irrelevant	10.8	15.0
Boring	8.6	11.3
Don't Like It	22.3	17.5
Content Coherence	.7	2.5
Don't Like Animals	1.4	0.0
No One Helped Me	0.0	2.5
Unclassified	0.0	1.3

Chi-square Pearson value 9.55313 df = 7 Sign. = .21534

For question three, gender was again used as a categorical variable. Table 5 shows that there were no statistical differences in attitudes toward problem solving tasks. Interestingly, most (66.4% of females and 57.5% of males) preferred to work with routine tasks rather than those that are vague and require study to solve -- these are factors associated with application-level problem solving. This finding seemed consistent with GEFT scores and many of the students' attitudes toward math and science.

Table 5

Cross Tab: Preferred Problem Solving Situation by Gender

	Females		Males	
	n = 149		n = 87	
Situation	Expected Value	%	Expected Value	%
Vague Tasks/Require Study	54.9	33.6	32.1	42.5
Clear/Familiar Tasks	94.1	66.4	54.9	57.5

Chi Sq Pearson Value = 1.89960 df = 1 Sign.= .16812

Discussion

The data reported here indicates that many of the students in marketing education had the restructuring skills that were expected (Fritz, 1992; Holland, 1985) and thus the attitudes toward mathematics, science, and problem solving that could be predicted by these restructuring skills. Thus, the goal of this study was accomplished, and the attitudes of socially oriented vocational students toward mathematics, science, and problem solving situations were determined. From an instructional perspective, the data reported above seems to pose a challenge when the task is to prepare students for high performance jobs.

Theories of personality and cognitive structures (Holland, 1985; Witkin & Goodenough, 1981) predict that harmony among attributes is evidence of the consistency that should be achieved by students of this age. Therefore, if this finding is extended, it leads to the belief that these students could automatically look for careers that call for with-people skills. To equip them with vital job skills that lead to high performance and high wage careers, these students will need the reasoning and problem solving skills that are promoted in the call for higher educational standards. Because of their levels of restructuring skill and personal preferences, though, the role of the curriculum, including its support for personality and cognitive orientation, should be taken into account.

The curriculums in many of today's secondary schools do not account for these factors or the idea that careers that have a with-people orientation may require complex skills and specialized interests. Indeed, they seem to be promoted without regard to their impact on the learner or learning. They often emphasize a traditional teacher or content-centered approach to schooling. This even seems true for tech-prep.

There is little contemporary support for this proposition. Instead, the evidence seems to be that specific programs do not develop problem solving skills (Cronbach, 1963; Tanner & Tanner, 1990). Problem solving is a process skill that can be developed in any program (Cronbach, 1963). To be effective, though, instruction must account for learner readiness and the factors that promote enduring motivation (Snow, 1987). Consequently, if students have consistent personality and cognitive patterns, as seemed to be the case for many students in this study, the resulting harmony should be taken into account in their course options. Students with a social learning style may need support from programs that have a with-people orientation.

The magnitude of this need was suggested in the data. Over half of the students, and perhaps up to 70%, could have a strong to moderate with-people orientation. Only 5% seemed to have what could be called strong restructuring skills. Thus, because curriculums with a mathematics and science foundation, including the technology fields in vocational education, are likely to support the attributes in an analytical style, other options may be needed for students who want and could benefit from a socially-oriented learning environment. To find out, research is needed that focuses on learning and the learner in order to determine how individuals develop complex skills. In this mix, the roles that personality and cognitive structure play in this process need to be determined.

The need to do this is predicated on the idea that people tend to gravitate, perhaps automatically, toward programs and careers that reinforce their personality and cognitive skills (Holland, 1985; Witkin & Goodenough, 1981). Consequently, the need for options is based on what people need to maximize their own effectiveness, to become experts in a variety of occupational fields. Based on what theories of human and career development say, then, as students acquire focused and clear inclinations, they need curriculum options that encourage them to develop detailed content and process skills. Therefore, the merit of this study is simple. It reinforces and confirms the place of personality and cognitive theory in secondary vocational education.

The goal of economic revitalization fostered by the Perkins Act, including enhanced productivity, rest on the assumption that people will like what they are doing. Motivation and personal satisfaction are essential to productivity on all types of jobs. The fields of marketing and human services operate on an information-intensive basis, often in ill-structured and ill-defined situations. Thus, the need for enhanced problem solving skill is evident in these fields as well as those that involve production. Thus, marketing and other service occupations must develop among its students an intense knowledge about people and how they function in daily life. These topics are not prominent in programs with a mathematics and science orientation, though the impact of these fields on people may be a secondary consideration.

Based on this speculation, it seems possible that programs like marketing education and home economics must answer this question: What can they do to support their students in the development of valued process skills within their own content framework? At present, solutions to this question are virtually non-existent. Consequently, students with a social learning style have become or could be the next "forgotten" element in public education.

While this study was consistent with theoretical expectations, it also suggests may challenges to the development of contemporary skills. In the main, its implications are for vocational development, personal guidance, educational reform and policy, curriculum structure and cognitive development. It also has a message for tech-prep and curriculum integration, particularly their scope. Finally, this study may also contribute to an issue Beck (1991) and Schmidt (1992) noted -- knowledge about the cognitive characteristics of vocational students.

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American Educational Research Association

1994 Annual Meeting

Experiences of Average Students in Untracked High Schools:

The Hidden Tech Prep Population

Kenneth Gray
The Pennsylvania State University
119 Rackley Building
University Park, PA 16802
814-863-2593
Bitnet gty@psuvm

Experiences of Average Students in Untracked High Schools: The Hidden Tech Prep Population

Kenneth Gray, Penn State University

Background

The countries eroding global economic competitiveness has focused unprecedented attention on the role of the public schools in improving the nations work force. The rationale for this attention is perhaps most succinctly outlined by Lester Thurow when he suggests in Head to Head (1992) that America may have the best educated professional work force but is woefully behind when it comes to the educational level of the average worker. As a result, and perhaps for the first time, talk about educating all students, not just the academically blessed, has become something other than an egalitarian rhetoric. Today it is somewhat of an economic imperative. There is even the possibility, admittedly remote, that while the 1950s and 1960s was the educational age of Sputnik that focused on the education of the academically brightest students, the 1980s and 1990s will be the age of global economic competition that will focus on the education of the academically average students.

Clearly, the long run solution to improving the education of students with average academic ability starts in the elementary schools. In the short run, however, the focus has to be on the nations high schools in hopes of remediating present generations of graduates. The question then is how should high school be reformed to better educate all students. Two classic solutions are offered. One is to develop unique programs of study for average students, the best example being the "integrated tech prep" model contained in the Federal Perkin's Act and being developed by the National Center for Research in Vocational Education. The second is the single curriculum approach advocated by most educational guru's (see Boyer, 1993 & Sizer 1984 & 1992). The argument being that all students would learn more if the curriculum was not differentiated--tracked--but instead all participated in a single academic or college preparatory curriculum. This research was designed to test the latter hypothesis by examining what actually are the educational and subsequent postsecondary experiences of average students who take the college preparatory program.

Methodology

This research is best described as a case study. The population consisted of all graduates (n=1,310) of seven affluent public high schools in the suburbs surrounding a large eastern seacoast city. While studying only affluent high schools has drawbacks in terms of generalization of results to all high school students, it has one important advantage for investigating the single curriculum issues, namely that virtually all students are in a common college preparatory program. Less than 7 percent of the graduates studied had completed an approved vocational education program; an amazing 81 percent took the scholastic aptitude tests (SAT).

Data were collected from two sources. First, information regarding high school course taking patterns and achievements was collected from the each graduate's high school transcript. Second, data regarding the experiences of graduates during the first year after graduation was collected via a survey mailed to a 50 percent sample that was stratified by class standing in order to insure that the sample equally represented students of all levels of academic success. The two data sets were then merged allowing the researchers to relate high school experiences of specific groups of students to their post secondary experiences.

Findings

Transcript data were collected for all 1,310 graduates. Sixty-one percent (61%) of the 50 percent sample responded to the survey instrument. A phone follow-up of non-respondents was conducted to insure that non-response was random.

Whereas 93 percent of all graduates were in the college preparatory curriculum, an initial analysis was conducted to determine how many of the students actually met the goal of this program of study, specifically, how many earned credentials associated with admission to competitive colleges. It was found that while virtually all students were in the college prep curriculum, only 30 percent earned credentials associated with admissions to competitive colleges and universities: namely combined SAT's of 1000, a B average, and completing the standard college entrance course sequence of three levels of college math, two levels of college science, and two years of the same foreign language. An additional 24 percent completed these courses, had a C average, and combined SAT's of 800. The remaining 46 percent of the graduates, 85 percent of whom were college preparatory students, did not earn credentials that would suggest they were prepared to do college level academic work. Furthermore, most of this group (85%) had not taken a vocational education program. The question then is were they successful the first year after graduation.

The postsecondary experiences of the non-competitive students were marginal at best. While 56 percent did go on to higher education, 46 percent of whom attended four-year colleges, 46 percent were required to take one or more remedial courses in math or reading for comprehension their first year in higher education and only 52 percent had earned sophomore status after one year.

Meanwhile, those who went to work were earning on average $13,500 a year. They worked primarily in foods and service industries. Typically they worked in small firms: 70 percent worked in firms of less than 100 employees, and 46 percent worked in firms of less than 20 employees. Only one in six reported receiving any formal training.

Implications

The results of this study suggest the need to question the single curriculum philosophy and the drift of more and more students into the college preparatory curriculum. When all students take the traditional college preparatory curriculum, the academically blessed excel, another group are marginally successful, and the rest--the academically non-competitive--end up with an education that, when judged by their post secondary experiences, was of limited value. In the population studied, a population drawn from some of the most prestigious public high schools in the nation, this non-competitive group represented 46 percent of the population. The implication is that efforts such as the "integrated tech prep" movement that advocates curriculum revisions aimed at the academically average student, including the increase the use of contextual and cooperative learning and focused preparation for two year post secondary technical education, deserves considerable attention by the secondary education community, and the nation.

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Table One

Follow-Up Data Summary

Academically Non-Competitive Student

High School Experiences:	% taking Algebra	81%
	% taking Algebra II	34%
	% taking Physics	14%
	SAT Scores:	
	Verbal	365
	Math	389
	% taking	69%
	% two year same foreign language	45%
	% hold part-time employment	76%
	% wished worked harder	74%
	had more opportunity to explore career	63%
Post Secondary Experiences:	Status Oct. 1, 1991	
	full-time student	56%
	full-time employment	29%
	part-time and other	15%
	Post Secondary Education	
	four year colleges	47%
	community colleges	38%
	technical schools	15%
	% taking remedial courses	46%
	% earning sophomore status	52%
	% receiving financial aid	41%
Working Full-Time:	% working in firm < 100 employees	70%
	% working in firm < 20 employees	46%
	received formal training	20%
	average salary	$13,500

American Educational Research Association Symposium

Toward the New Vocationalism: Critical Perspectives on Education and Work

Vocationalism and the American High School: Past, Present, and Future

An Essay by

Kenneth Gray , The Pennsylvania State University

The purpose of this essay is to discuss the possible emergence of a new vocationalism in the nation's high schools. I will argue that there are or have been three distinct periods of vocationalism in the American high school: specifically that vocational education, a form of vocationalism that developed at the turn of this century, is declining; that a new form of vocationalism - "college mania" - has taken its place by default; and that a third form of vocationalism associated with Integrated Tech Prep concepts may be emerging. The theme of the essay is that although a new vocationalism (Integrated Tech Prep [ITP]) may be a priority of federal policy makers and growing numbers of enthusiastic educators, its ultimate success depends on the degree to which parents and students share the vision of future employment opportunities which is implicit in the Tech Prep initiative. To develop this argument, the historical evolution of vocationalism in the American high school will be explored, with particular attention to the role played by students and their parents.

Vocationalism is defined in this essay as the method used by schools, particularly high schools, to organize their curriculum so that students may develop skills, both vocational and academic, that will give them the strategic labor market advantages needed to compete for good jobs. Vocationalism is a fascinating concept, for one, because of its remarkable comeback or rehabilitation in the last five years.

It need be said that the question of whether high schools should be involved in vocationalism at all has been a matter of considerable debate throughout the history of public education. This author admits to the belief that it is a moot point: in my view, all education beyond literacy is vocationalism of one sort or another; the motives of students in the college preparatory program, according to most studies, are first and foremost vocational in nature, with a healthy dose of social status mixed in.

Suffice it to say that the widespread, unquestioned endorsement by public policy makers of the conclusions published in the Nation At Risk in the mid 1980s suggests that at this point in our history the public definitely believes that the schools' responsibilities include preparing graduates to be something called "world class workers." Those seeking to reform the schools in this direction are in fact attempting to redesign the form of vocationalism that exists presently and officially, namely vocational education. Thus, an important issue for those seeking to reform the high school curriculum with a new form of vocationalism is the historical development of past and present forms of vocationalism. Aided by these insights, reformers' efforts may be better able to successfully reshape that "black hole" of educational reform efforts, the American high school curriculum.

The Old Vocationalism: Vocational Education

Most educational historians trace vocationalism in American schools to the turn of the century movement to differentiation of the high school curriculum to include vocational education courses. This development took place in times much like these. Rationalizing the inclusion of vocational education in the American high school, influential educational historian Ellwood Cubberley wrote in 1909 that "The Great Battles of the Future will be Commercial not Military" (pp. 49-50). As we find today, world economic competition was viewed as the best strategy for national economic growth; the schools were accused of doing little to help the cause, particularly in regard to the education of children from working-class families who were beginning to go to high school in large numbers. The solution was to differentiate the curriculum of the American high school, by first adding commercial education and later industrial education, home economics, and vocational agriculture.

The addition of four occupational programs of study to the high school curriculum was a concept developed by educators with significant input from social reform groups. These courses of study reflected this group's vision of the future world of work as well as potential opportunities for good non-professional jobs. The idea was pretty simple; students would select a course of study depending on the type of occupation or role they aspired to and were suited for. Reflecting a classical view of the home, the addition of home economics was due to the continuing belief that women's place was ultimately family- and household-oriented. For individuals entering the work force, the curriculum was vocationalized to include commercial education for those aspiring to clerical occupations, industrial education for those interested in crafts, and agriculture for those who would remain on the farm. Those few who would enroll in higher education institutions and prepare for professional careers stayed in the classical curriculum, the predecessor of today's college preparatory program.

The important question now is: Why has this particular form of vocationalism persisted and prospered for eighty years, and why has it begun to unravel? This question is important because its answer may provide critical insight for those seeking to promote a new form of vocationalism in the future. The old vocationalism survived for some 70 years because some students and their parents shared the designers' view of future occupational roles and opportunities. Accordingly, they enrolled in commercial education, which became business education, trade and industrial education, or vocational agriculture. Many girls who envisioned a life as a full-time homemaker enrolled in home economics courses. The vocational education form of vocationalism began to decline when students and parents no longer shared the vision of future opportunities and the stereotyped roles that were/are implicit in vocational education. The essential point is that students and parents ultimately are deciding the fate of the vocational education form of vocationalism, and will decide the fate of possible future models.

The Shopping Mall High School

Despite large amounts of literature that laments tracking and views this tracking into or out of vocational education courses by school officials, especially guidance counselors, as a conspiracy, the reality is that - at least today - students most often take what they want in high school. As wonderfully described by Powell et al. (1985), today's high schools are more like "shopping malls" than highly structured "tracked" institutions. As long as students fulfill state-imposed graduation requirements, they can take any courses they wish to with few exceptions, and even these exceptions are more often than not quickly waved when questioned by a parent who wants his/her child to take a particular course. The important point is that educators may design high school programs of study but students and their parents ultimately endorse or veto these designs through their enrollment decisions. The programs of study that prosper in high schools and thus the form of vocationalism that persists, is in the end determined by the course-taking patterns of students.

At this point, the relevant question is: What motivates the course-taking decisions of high school students? It is argued here that the prime motivation is the degree to which students and parents view particular courses and programs of study as consistent with their post-secondary plans and career aspirations. Thus, as argued by Harvey Kantor in Learning to Earn, (1988) the old form of vocationalism, namely curriculum differentiated by various vocational education offerings, succeeded or failed based on parents' perceptions of viable relationships between these courses of study and real opportunities. For example, commercial or business education very successfully enrolled large numbers of high school girls, but began to decline when the doors finally opened to other professional opportunities for women. Likewise, trade and industrial education was very successful in the post-World War II economic boom when in fact low-skill/high-wage work was plentiful. However, economic restructuring and the resulting uncertainty among students and parents about future occupational opportunities for those with only a high school diploma have led to a new vocationalism in the nation's high schools.

The New Vocationalism: College Mania

Beginning in the early 1980s, the old vocationalism began to come apart, meaning that while vocational education courses of study remained, students enrolled in fewer and fewer numbers. For numerous reasons, the public discovered that America was no longer the only great economic power, prosperity could no longer be taken for granted. More importantly, the public concluded that jobs in traditionally high-paying manufacturing industries and other industrial sectors that employed high school graduates were disappearing. The world of work endorsed by the old vocationalism was suspect. The only thing that seemed to be at all certain was the increasingly publicized fact that college graduates made more than high school graduates.

Faced with uncertainty about economic opportunities in the future and misinformation about career opportunities for future college graduates, and helped by an oversupply of college seats, students ushered in the new vocationalism in the American high school by rejecting traditional vocational education offerings and enrolling in college preparatory programs.

Numerous data support this argument. Between 1982 and 1990, the national percentage of students enrolled in college preparatory programs increased by 10%. During the same period, enrollment in vocational education programs declined in 32 states. Correspondingly, the percentage of high school graduates who go directly on to higher education has grown significantly since the late 1970s. Nationally, 63% of the 1991 graduates went on to higher education, compared to 49% in 1980 and 46% in 1973. Importantly, the largest increases have been among females who in the past might have enrolled in either business education or home economics; nationally, 67% of all females went on to higher education, compared to 43% in 1973 (U.S. Dept. of Ed., 1993).

A new vocationalism has emerged in the nation's high schools, manifested in the form of growing percentages of academically average students enrolling in traditional college preparatory programs. Their enrollment is not motivated by some newly found thirst for knowledge, but for vocational reasons. They and their parents believe that future jobs with some potential for a decent standard of living require this course of action. It is vocationalism in the form of "college mania"; by way of illustration, in June 1993 alone, the number of students graduating with baccalaureate degrees from this country's colleges and universities was greater than the total population of New Hampshire.

Problems with the Present Vocationalism

In the old vocationalism, approximately one-third or more of the nation's high school students prepared for careers through school-run vocational education programs. Now, the majority are enrolling in college preparatory program as a reaction to the new economic uncertainty. The idea is that higher education will lead to a good career. This would seem at first glance to be a rather positive development--high school students enrolling in college preparatory programs and going on to higher education. Well, celebrations may be premature.

In a study of seven suburban high schools (Gray, Wang, and Malizia, 1993), where virtually all students were in the college preparatory program, 46% of those enrolled in this curriculum failed to compile an academic record that would even remotely suggest preparation for college-level academic work; this record included failure to obtain a combined SAT score of at least 800, or take a minimal course preparatory sequence of course or earn at least a C average. While a majority (56%) of this group did go on to higher education (almost one-half [47%] went to four-year colleges), 46% had to take one or more remedial courses and 48% failed to earn sophomore status after one year. Meanwhile, those who went to work instead were mostly employed primarily in minimum wage employment and received no formal training from their employers. These findings suggest that some very serious problems have emerged in the current form of vocationalism. When students with average academic ability - the traditional consumers of the old form of vocationalism - enroll in the traditional college preparatory course they are prepared neither for college or work. This group of students is the hidden ITP population and potential consumers of the emerging vocationalism.

Meanwhile the costs of the new form of vocationalism for students, parents and the tax payer is mind-boggling. Between 1980-81 and 1990-91, tuition, room and board increased 66% at private institutions and 32% at public institutions, while family income actually fell 2%. Today, the average student graduates with at least $9,800 of debt. Students and their parents alone spent $80 billion on higher education last year, much of it borrowed.

Then, there is the reality that the economy will not generate sufficient college-level employment for the hordes graduating with baccalaureate degrees. According to Department of Labor projections (Eck, 93) , while in the 1960s and 1970s only one in five college graduates failed to find commensurate employment, today, it is one in three and growing.

What then is the reason for the current vocationalism or college mania? Faced with economic uncertainty, most students and parents view college as a way to ensure an enjoyable standard of living. There has got to be a better way. The nation needs technicians, not a flock of discontented young adults who hold worthless baccalaureate degrees and have no job prospects--a phenomena that is well underway. A new form of vocationalism - ITP - needs to be implemented in the nations high schools. The question is will it?

The Emerging Vocationalism: Integrated Tech Prep

A new form of vocationalism is being advocated, piloted, and adopted in growing numbers of high schools across the nation--namely, Integrated Tech Prep (ITP). Briefly, ITP is a high school program of study designed to prepare and motivate students to attend two-year post-secondary technical education institutions after graduating from high school. Its elements include both technical and academic components, especially in mathematics and physics. Whereas the traditional college preparatory program is articulated with colleges, this curriculum is articulated with two-year post-secondary technical education institutions.

Like the vocationalism of old, ITP is a reaction to demands that the schools do a better job educating the nation's work force. ITP's design is based on a vision of a future economy that will offer significant amounts of high-skill/high-wage technical work. The rationale is that low-skill/high-wage work has gone abroad and will not return. The future for industrialized nations lies in developing an economy that produces goods and services which require high technical skills and therefore will support high wages.

In fact, some evidence supports this occupational forecast. The technical work force is the fastest growing sector of the labor market; despite the hype, 70% of the technical occupations do not require a BA. degree. Two-year technical associate degrees provide skills that translate into labor market advantage in obtaining this type of work. Importantly a recent study by the Department of Labor, found that the wages of workers in these blue-collar technical occupations were exceeded only by those in managerial and specialized professional occupations and exceeded those of college graduates who were not in this latter elite group of occupations (Eck, 1993). Furthermore, many two-year associate degree programs in technology can lead to transfers to four-year degree-granting institutions.

Unfortunately, although the ITP form of vocationalism makes both educational and economic sense, this does not guarantee it will catch on in the nation's high schools. The future is at best tenuous. Even if the concept catches on with high school educators, its success lies in the degree to which academically average students and their parents buy the rationale, see the advantage of a technology associate degree over an expensive baccalaureate degree from a third-rate institution, and enroll in high school ITP programs. Beware, it will not be an easy sell.

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WHAT ARE THE EXISTING ARTICULATION PROCEDURES BETWEEN SECONDARY AND POSTSECONDARY EDUCATION AGENCIES IN NORTH CAROLINA?

Randy L. Joyner, Ed.D.
Assistant Professor
Department of Business, Vocational, and Technical Education
School of Education
East Carolina University
Greenville, NC 27858-4353

and

Eugene V. Giovannini, Ed.D.
Dean of Instruction Affairs
Indiana Vocational-Technical College
Evansville, IN 47710

Paper presented at the

American Education Research Association Meeting

New Orleans, Louisiana

April 4-8, 1994

WHAT ARE THE EXISTING ARTICULATION PROCEDURES BETWEEN SECONDARY AND POSTSECONDARY EDUCATION AGENCIES IN NORTH CAROLINA?

Randy L. Joyner and Eugene V. Giovannini

Introduction

By the year 2000, 70% of the labor force will **not** require a baccalaureate degree, but 60% of the labor force will require some type of postsecondary preparation less than a baccalaureate degree. On a national basis, 24% of our young people drop out before graduating from high school; and at the most, 25% of the ninth graders who enter high school complete a baccalaureate degree. Between 50% and 60% of our young people are leaving school not prepared for further learning or productive employment (Hoerner, 1992). Therefore, TECH PREP, a fairly recent phenomenon in education is part of the educational reform movement that may solve this problem.

Educators all over the United States have been quick to embrace TECH PREP. It was first discussed by Dale Parnell, who is considered the "father" of TECH PREP when he was president of The American Association of Community and Junior Colleges, in THE NEGLECTED MAJORITY (Parnell, 1985). Parnell maintained that TECH PREP may be an ideal solution for the middle 50% of students--those students who will be entering occupations requiring some post high school training but not necessarily a baccalaureate degree. A recent poll conducted by the National School Board Association revealed that 92% of local school policymakers support programs that would encourage secondary and postsecondary schools to develop applied academic courses that better coordinate vocational-technical education programs (Parnell, 1992). According to Hull (1992), able and teachable students who find the classic education ineffective in preparing them for technically elite jobs fall through the cracks in our educational system. Thus, TECH PREP may help eliminate this potential problem.

TECH PREP is an educational program that was developed and designed to prepare a competitive workforce. Further, TECH PREP is a series of courses and related school-supervised work experiences that prepare students for a successful transition from secondary school to postsecondary technical education or to work. Most often, it is a 2 + 2 program which involves two years of secondary and two years of postsecondary technical training. Its curriculum provides applied academic and technical courses that lead to an associate degree, a certificate in a specific technical field, or completion of an apprenticeship experience. It joins high schools with community and technical colleges to offer stronger, better programs without overlap of content. Completion of the secondary portion of a TECH PREP program must signal academic and technical competence to higher education institutions and employers--the content of TECH PREP programs must be as rigorous and maintain the same integrity as college preparatory programs.

Purpose/Objectives

The ***Carl D. Perkins Vocational and Applied Technology Education Act of 1990 (P. L. 101-392, Title III, Part E)*** established a TECH PREP education program whereby federal grants are offered to states to plan and successfully implement training for the middle majority. In addition, the act provides funds to local consortia of schools and colleges to develop TECH PREP programs (Gold, 1991). Many North Carolina local education agencies (LEAs) have used these monies to plan, develop, and implement TECH PREP programs. In North Carolina, school systems have complete autonomy in developing TECH PREP Articulation Agreements. Therefore, the content of the articulation agreement is unknown as well as how it functions due to the lack of a universal understanding of the TECH PREP Articulation Agreements by educational leaders at all levels in North Carolina. Thus, many questions concerning the TECH PREP Articulation Agreements between secondary and postsecondary institutions in North Carolina need to be addressed. This study focused on two research questions: (1) What type or types of educational agency or agencies are involved with existing North Carolina TECH PREP Articulation Agreements? and (2) Within those existing North Carolina TECH PREP Articulation Agreements; how do secondary students, upon entry at the postsecondary educational agency, receive credit for courses that they have completed that are covered by the articulation agreement?

Methodology and Data Collection

To answer the two research questions, the director of federally funded vocational education programs within the North Carolina Department of Public Instruction was contacted. The director was asked to identify three model TECH PREP programs in each of the three regions of North

Carolina--Mountain, Piedmont, and Coastal. After the nine model programs--three from each of the three regions--were identified, those nine LEAs were contacted, and they were requested to send copies of their TECH PREP Articulation Agreements to the researchers.

Survey Instrument. Upon receipt of the materials from all nine LEAs, the researchers then prepared a survey instrument--a questionnaire. The questionnaire was based on information obtained from the nine model programs that forwarded copies of their existing TECH PREP Articulation Agreements. Specifically, the survey instrument addressed the following areas: (1) Does a TECH PREP agreement exist? (2) If yes, with what type of education agency? (3) If yes, how does the agreement work with the other education agency--how do the students receive credit or placement upon entry at the other education agency?

Reliability and Validity. After the questionnaire had been developed, the instrument was reviewed by three individuals who are perceived as experts in TECH PREP Articulation Agreements. Further, these individuals indicated that the instrument was designed to obtain the data needed to answer the two research questions that were to be addressed in this study--it was valid and reliable. Upon receipt of this validity and reliability certification, the questionnaire was duplicated and mailed to Vocational Education Directors for all 148 North Carolina school systems. The 148 Vocational Education Directors were asked to complete and return the questionnaire along with copies of their articulation agreements by a specified date to the researchers. In order to achieve a reasonable response rate, a procedure to either mail a follow-up card or place a telephone call was developed to remind those vocational education directors that had not responded by the specified date.

Data Analysis

Data were collected by using a survey questionnaire devised by the researchers. The instrument asked vocational directors in North Carolina's 148 school systems to indicate the status of TECH PREP Articulation Agreements within their school system. Specifically, the questionnaire addressed: whether or not a TECH PREP Articulation Agreement existed; and if an agreement existed, what guidelines were included within the agreement to articulate secondary school coursework with postsecondary educational agencies. Number Cruncher, a microcomputer statistical analysis software, was used to generate frequency distributions and percentages.

Findings

The findings are presented in five sections. They are: (1) Usable Responses, (2) Current Status of TECH PREP Articulation Agreements, (3) Future Existence of TECH PREP Articulation Agreements, (4) Education Agencies Involved with TECH PREP Articulation Agreements, and (5) Articulation Procedures.

Usable Responses. Ninety of the 148 questionnaires were returned for a usable response rate of 60.8%. Information contained within Table 1 describes the number of responses received by the three regions in North Carolina: Coastal, Piedmont, and Mountain. School systems located in the

Coastal region of North Carolina returned thirty-nine questionnaires representing 43% of the total responses. School systems located in the Piedmont region of North Carolina submitted 35 completed instruments or 39% of all usable responses. And, school systems in the Mountain region of North Carolina returned 16 responses or 18% of the usable responses.

Table 1

Response Breakdown by Region

Region	Number of Responses	Percentage of Return
Coastal	39	43%
Piedmont	35	39%
Mountains	16	18%
Totals	90	100%

Current Status of TECH PREP Articulation Agreements. Information presented in Table 2 indicates that 76 of the school systems responding--approximately 85%--indicated that their educational agency had, in place, a TECH PREP Articulation Agreement with another educational institution. Further, four school systems that responded to the survey--4% of the total respondents--do not have a Tech Prep articulation agreement. Hence, the remaining 10 school systems that responded--approximately 11%--did not respond to the question.

Table 2

Current Existence of TECH PREP Articulation Agreements

Existence of an Agreement	Number of School Systems	Percentage of School Systems
Have an Agreement in Place	76	85%
Do not Have an Agreement in Place	4	4%
No Response	10	11%
Totals	90	100%

Future Existence of TECH PREP Articulation Agreements. Information contained within Table 3 indicates that 88 of the 90 school systems responding--approximately 98%--either have a TECH PREP Articulation Agreement in place or plan to develop an agreement. Only two school systems that responded to the survey indicated that they did not have a TECH PREP Articulation Agreement and that they did not have plans to develop a TECH PREP Articulation Agreement.

Table 3

Future Existence of TECH PREP Articulation Agreements

Existence of an Agreement	Number of School Systems	Percentage of School Systems
Have or Will Have an Agreement in Place	88	98%
Will not Have an Agreement	2	2%
Totals	90	100%

Educational Agencies Involved in TECH PREP Articulation Agreements. Information in Table 4 describes the types of educational agencies that are involved with school systems in a TECH PREP Articulation Agreement. Eighty-six of the school systems that responded to the survey--approximately 95%--indicated the type(s) of educational agency(ies) that were involved in a TECH PREP Articulation Agreement with the school system(s); 4 school systems who indicated that a TECH PREP Articulation Agreement was in place did **not** identify the educational agencies that were involved with TECH PREP Articulation Agreements. Of the 86 school systems who identified the type(s) of educational agency(ies) that were involved with their TECH PREP Articulation Agreement, 72 school systems--approximately 84%--indicated that their TECH PREP Articulation Agreements are with public, technical, or junior colleges ***only***. Another seven school systems that responded--approximately 8%--indicated that they had TECH PREP Articulation Agreements not only with these types of colleges (public, technical, and junior colleges) but with other educational agencies as well. For example, two of these seven school systems reported that they also had TECH PREP Articulation Agreements with a private college/university, another two of the seven school systems reported that their TECH PREP Articulation Agreements included both private and public colleges/universities, and the remaining three of the seven school systems indicated that their TECH PREP Articulation Agreements included publicly sponsored apprenticeship programs. Thus, 79 of the school systems responding--approximately 92%--have articulation agreements with public, technical, or junior colleges.

Table 4

Types of Educational Agencies Involved in Articulation Agreements

Educational Agency	Number of School Systems	Percentage of School Systems
Public, Technical, Community, or Junior Colleges **ONLY**	72	84%
Public, Technical, Community, or Junior Colleges and other Educational Agencies	7	8%
Other Educational Agencies	7	8%
Totals	86	100%

Articulation Procedures. Information presented in Table 5 describes how students upon enrollment at the educational agency(ies) involved with a TECH PREP Articulation Agreement receive credit or advanced placement. Eighty-three of the school systems that responded--approximately 92%--revealed how students receive credit or advanced placement, based upon the contents of a TECH PREP Articulation Agreement, for courses completed at the school system prior to entry at the other educational agency. Seven of the school systems that indicated a TECH PREP Articulation Agreement was already in place did *not* indicate how credit or advance placement was awarded. Of the 83 school systems that responded to this question, 21--approximately 25%--of the school systems responding indicated that college credit is awarded upon completion of the educational agency's exam *only*. Another 30 of the 83 school systems responding to this question--approximately 36%--indicated that two procedures were used when awarding credit or advanced placement for courses completed prior to entry at another institution involved with the TECH PREP Articulation Agreement. These 30 school systems stated that students receive college credit for courses taken prior to entry upon completion of the educational agency's exam in conjunction with other means of receiving credit or placement. However, the guidelines used by these 30 school systems for advanced placement varied--there was not a distinct pattern or trend. Another ten school systems--approximately 12%--indicated that students receive advanced placement in a higher level class and are awarded college credit **only**. Another 19 of the 83 school systems responding--approximately 23%--reported that students receive both advanced placement in a higher-level postsecondary class and college credit for courses completed prior to enrollment at the postsecondary educational agency. In addition, these 19 school systems applied other guidelines for advanced placment. Primarily, these 19 systems relied on an examination that was administered prior to enrollment at the postsecondary institution. Another eight of the 83 school systems responding--approximately 10%--reported that students are given advanced placement in higher-level classes and are ***not*** awarded college credit--no credit is given for courses completed at the secondary-school level. Another 11 school systems that responded-- approximately 13%--*"**wrote in**"* that, within their TECH PREP Articulation Agreements, students either receive credit or placement if a predetermined grade is earned by the student in the high school course completed prior to entry at the articulating educational agency.

Discussion

As the State of North Carolina was a pioneer in the TECH PREP movement, the majority of the school systems within in the state should have TECH PREP Articulation Agreements. Thus, the findings of this study support this idea that a majority of school systems within North Carolina have existing TECH PREP Articulation Agreements. Based upon the school systems that responded to the survey, agreements currently exist or will exist in all but a few North Carolina school systems.

The essential element of a TECH PREP educational program is the articulation agreement. Most articulation agreements are between high schools and public, technical, or junior colleges only. This is understandable considering that community/ technical colleges proliferate North Carolina. Currently, 58 different public community colleges and/or technical institutes exist in North Carolina. Many of these 58 institutions have branch campuses and additional instructional sites. Also, agreements are most often between secondary school systems and with associate-degree granting institutions--two-year colleges. It is surprising that the involvement of North Carolina public four-year colleges/universities in agreements is virtually nonexistent.

Table 5

How Students Receive Credit or Placement in an Articulation Agreement

Agreement	Number of School Systems	Percentage of School Systems
College Credit is Awarded Upon Completion of an Exam Only	21	25%
College Credit is Awarded Upon Completion of an Exam and by Other Means of Receiving Credit or Placement, for Courses Taken, Upon Entry at the Other Educational Agency	30	36%
Students Receive Advanced Placement in a Higher Level Course and are Awarded College Credit Only	10	12%
Students Receive Advanced Placement in a Higher Level Course Are Awarded College Credit in Conjunction with Another Mehod of Receiving Credit or Advanced Placement	19	23%
Students are Advanced Placed in Higher Level Course and not Awarded College Credit	8	10%
Students Receive Credit or Advance Placement if a Predetermined Grade is Earned in the High School Course	11	13%

Nearly all North Carolina high school TECH PREP students have the opportunity to receive credit or advanced placement at another educational agency for courses completed at the high school level. The specific arrangements for determining how the credit or advanced placement will be awarded is contained within the TECH PREP Articulation Agreements. A majority of the existing agreements stipulate that students will receive college credit upon completion of the postsecondary educational agency's exam.

Requiring successful completion of an exam to receive credit may indicate that agreements are negotiated by administrative/admission personnel and not are constructed by faculty. Faculty at both the secondary school level and the postsecondary level would probably articulate course content and a means of measuring proficiency of that content within the high school course. It may also reveal a lack of trust between secondary faculty and postsecondary faculty as to the rigor of the high school curriculum and the worthiness of a non-college preparatory high school curriculum being considered as college parallel. A few agreements do permit students to receive advanced placement in a higher level class and to be awarded college credit. Those agreements which allow credit or advanced placement based upon coursework completed at the secondary level is representative of ***"pure"*** demonstrated curriculum proficiency articulation. Agreements of this type are most worthy of modeling.

It is interesting to note that one method of receiving credit or advanced placement was ***"written in"*** by a large number of school systems that responded to the survey. With a relatively high number of ***"write in"*** comments was *the practice of "the awarding of college credit and advanced placement granted by most colleges with the condition that a student must* *earn a predetermined grade in the high school course.*" Again, this practice is more ***"administrative"*** driven than it is ***curriculum content articulation***.

According to the respondents to this instrument, two major methods were used to award credit upon entry at the postsecondary educational agency. The two methods were: (1) college credit is awarded upon completion of the postsecondary educational agency's exam and (2) advanced placement in a higher-level postsecondary class and college credit for the previous coursework completed at a secondary educational agency which is contingent upon satisfactory completion of the higher-level course at the postsecondary institution. None of the vocational education directors surveyed reported that unconditional college credit was awarded.

Conclusion

TECH PREP Articulation Agreements are currently functioning in a majority of the school systems in North Carolina. However, a pattern does not exist in the operation of each agreement. Yet, one common theme does emerge--courses included within the agreements are along traditional discipline content lines. Based upon this preliminary analysis, one question still remains--will TECH PREP programs as they currently exist in North Carolina assist in providing a workforce that is better prepared for the 21st century and beyond?

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IN SEARCH OF VOCATIONAL TEACHER EDUCATION

Richard L. Lynch

School of Leadership and Lifelong Learning
The University of Georgia

Paper prepared for presentation at the annual
convention of the American Educational Research
Association, New Orleans, LA, April 8, 1993

Running head: VOCATIONAL TEACHER EDUCATION

INTRODUCTION

If change is unsettling, these are indeed agitated times. Change and the resultant agitation are especially apparent as our nation's leaders and scholars debate the content and processes that must be in place to insure that American youth and adults are adequately prepared for realities of the modern workplace, contemporary society, and the international arena--now and in the future.

Literally scores of policy-oriented documents have been published in the last 10 years demanding that schools educate better all children, youth, and adults. The Government (i.e., through the Carl D. Perkins Vocational and Applied Technology Education Act of 1990--Perkins II) has called for a different type of education and for redirected training programs to prepare our nation's students for the 21st Century workplace. Many, many reform initiatives have been postulated or conceptualized and a few have been implemented and (sometimes) evaluated in the public schools in the past ten years--often with mixed results (see, for further discussion, Lynch, Smith, & Rojewski, 1993).

Generally, researchers and policy groups conclude that long-term sustaining, substantive changes will occur in public education only if implemented at the grassroots level--in local schools and by classroom teachers. But, too often, local personnel seem unable, unwilling, or insufficiently informed to make necessary changes. And thus, many recent education reform efforts have met with mixed results.

Recently, the Education Commission of the States placed "part of the blame" for the disappointing results of various education reform movements at the doors of colleges and universities that have failed to rehabilitate teacher training. And so did the Alliance for Curriculum Reform which reported that only 7 out of 3,380 high schools studied had combined popular school reforms with new teacher training (See Vocational Training News, 1994, p.2).

These reports, as well as many others addressing education reform, cite particularly the inability of teachers, school administrators, and other educational leaders (e.g., school boards) to negotiate curricular, pedagogical, and technological changes needed to bring about meaningful reform in public education. Scholars and observers of education say higher education institutions are not adequately preparing teachers (and school leaders) for change and are not addressing essential elements in school reform. Teachers continue to teach the way they've always been taught, primarily in very subject-specific contexts.

Similar comments emanate from state and local administrators responsible for vocational and technical education as they wrestle with the necessary changes underlying Perkins II and in school-to-work transition programs. Commentary--often accusatory in nature--ranges from the nonresponsiveness of colleges and universities to reform initiatives in vocational and technical education, low production of vocational and technical education teachers, inappropriate preparation of the few vocational teachers that colleges and universities are producing, professors are out of date, and on and on and on.

Purposes of this Paper

The information and data provided herein are part of a larger research, data, and information agenda prepared for and about vocational teacher education in American colleges and universities and through various state and local certification and staff development programs. The data and information are intended to overcome the serious lack of knowledge about where, when, what, how, to whom, and by whom vocational teacher education is provided (Lynch, 1991).

Data have been collected about the responsiveness of vocational teacher education to initiatives in Perkins II and to other reform movements relative to work-based education. Further information is being assembled about the preparation of vocational education teachers, their occupational experiences, and their effectiveness--with a particular focus on those who are alternatively certified. Information is also being gathered on the professorate and the financial status of vocational teacher education. These activities have been funded and/or supported in part by the National Assessment of Voçational Education, the National Center for Research in Vocational Education, and the University Council on Vocational Education.

This paper discusses the status of vocational teacher education as it currently exists in our nation's colleges and universities. The paper presents program and enrollment data about vocational teacher education in the subject-specific programs areas (i.e., college majors) traditionally identified with vocational teacher education. Some analysis and commentary is then provided about the future supply and demand of vocational education teachers.

Assumptions/Limitations

Data and information provided herein about vocational teacher education at our nation's colleges and universities are limited as follows:

1. This paper focuses on vocational teacher education as it exists in our nation's colleges and universities, primarily at the preservice level. Programs sponsored by state departments of education, vocational teacher associations, and local school systems--such as inservice and staff development to initially certify trade teachers, induct new teachers, or upgrade the knowledge and skills of vocational education teachers--are not discussed in this paper.

2. State vocational education certification policies, related requirements and regulations, and their impact on vocational teacher education at colleges and universities are not discussed in this paper.

   It is noted, however, that nearly all states certify a considerable portion of their vocational education teaching force without benefit of professional education (i.e., through alternative certification measures). This is especially true in trade and industrial education, health occupations, and technical education. In these subject areas, minimal state certification requirements range from a high school diploma equivalent (i.e., completion of a GED) and years of occupational experience to completion of some preservice college course completion and inservice workshops.

3. Data and information as published in extant literature served as the framework for data reporting and the basis for analysis found in this section of the document. These data were not collected nor reported in a systematic, consistent way among the various studies, by various authors, and in various subject areas cited in this paper. Thus, the reader is advised to interpret data cautiously.

THE UNIVERSE: COLLEGES AND UNIVERSITIES WITH PROGRAMS IN VOCATIONAL TEACHER EDUCATION

Background

It is not easy to determine exactly how many U. S. colleges and universities actually offer baccalaureate degrees (or programs) to prepare teachers of vocational and technical education. A primary reason for this difficulty is that the words, *vocational teacher education*, are not always the descriptors used to identify such programs. Rather, programs are more apt to be called by their subject-specific names (e.g., agricultural education, business education, home economics education). The problem is compounded in that there is no nationally-published directory identifying *vocational teacher education* programs.

A second reason is that programs that do exist are administered in very diverse units on our nation's college and university campuses. Lynch (1991) found vocational teacher education administered in 8 different colleges or schools and 6 departmental administrative structures. For example, agricultural teacher education might be administered in the College of Agriculture, business education in the College of Business, and technology education in the College of Education--all on the same campus.

An even more serious problem is that there is no agreed-upon conceptual framework or knowledge-base related to education for the workplace and workforce development that professionals or professional associations have codified as important in the preparation of teachers for secondary, postsecondary, or adult vocational and technical education programs. Thus, there does not seem to be a strong sense of

professional identity with a body of knowledge and a discipline related to vocational teacher education.

Rather, vocational teacher education programs still tend to be organized by programs identified specifically and historically in vocational education legislation; that is, by those in the Smith-Hughes Act of 1917 (agricultural education, home economics education, and trade and industrial education) and subsequent federal legislation (distributive/marketing education, industrial arts/technology education, business education, health occupations education, and vocational special needs). The primary delivery system at most colleges and universities is to prepare vocational education teachers through a baccalaureate degree in one of these vocational education program areas. There are some exceptions, primarily in trade and industrial education, health occupations, and technical education. In these vocational education subject areas, the majority of teachers initially receive alternative certification by substituting years of occupational experience for college-level preparation. However, a large percentage of these alternatively-certified teachers eventually receive college degrees in an education subject area.

By creating a matrix from subject-specific directories of teacher education programs, Lynch (1991) reported vocational teacher education existing in some form at 428 colleges and universities in the 50 states, Puerto Rico, Guam, and Washington, DC. This is approximately one-third of the more than 1,200 American colleges and universities which have the preparation of teachers as one aspect of their mission.

According to information published in 1988-89 program area directories, there were 90 teacher education programs in agricultural education, 236 in business education, 32 in health occupations education, 268 in home economics education, 89 in marketing education, 176 in industrial arts/technology education, 122 in trade and industrial education, and 98 in vocational special needs (Lynch, p. 191).

Upon closer review, however, Lynch found these numbers to be considerably inflated. Several colleges and universities--at least 10%--had closed their vocational teacher education programs. Many other programs (at least another 10%) hadn't graduated vocational education teachers in years. Some college officials responded that they didn't **really** have vocational teacher education programs, and they didn't consider the preparation of such teachers to be part of their mission.

Further, although faculty at many institutions had at one time engaged actively in vocational teacher education--and many continued active affiliation with their subject-specific field--their assignments over the years had shifted into other areas (e.g., teaching technical content courses, administration, service activities). Thus, the [former] teacher educator(s) was still at the university, listed in the teacher education directory for that vocational education subject area, and active in his or her vocational teacher education professional association; however, the program was in fact dormant or nonexistent.

Lynch (1991) did find that about 100 U. S. colleges and universities offer four or more vocational teacher education programs on a single campus; thus, implying that vocational teacher education was integral to the mission of that college or university. Many of the remaining 300+ programs listed in directories are staffed by a single faculty member (often at less than 1.00 full-time equivalent in teacher education), in one program (e.g., home economics), or a small cluster of faculty who work with prospective teachers in a technical program area (e.g., technology education teacher educator(s) working with prospective teachers--among other majors--in a School or Department of Technology).

Subsequent reviews indicate that these single-subject programs produce few teachers in any given year. Further, the small number of teacher educators in these programs and their isolation from other pedagogists preclude preparing students in a broadened conceptualization of vocational education (e.g., in integrating vocational and academic education, tech prep, workforce and workplace generic and specialized skill development) which might extend beyond that of their subject-specific area. In general, these subject-specific programs are far better known for their technical preparation than they are for teacher preparation. And, there is some evidence that as enrollments declined in teacher education, program faculty shifted their instructional assignments into non-teaching options (Volk, 1993).

The following is a brief review of recent studies that have reported and discussed contemporary program and enrollment status in vocational teacher education programs.

Agricultural Teacher Education

Interestingly, only one program in agricultural teacher education has been eliminated by a college or university in recent years, although most programs have small enrollments and few graduates. Oliver and Camp (1992) reported 89 agricultural education programs in 1991 compared to 90 in 1988 (Lynch, 1991). However, the authors noted that 10 of the 89 programs (11%) had zero graduates for the 1991-92 academic year.

The numbers of "newly qualified potential teachers of agriculture fell from 1,660 in 1975 to 625 in 1990," a 62% decline (p. 5). Oliver and Camp further reported that 266 agricultural teacher educators at the 89 colleges and universities graduated 312 teachers in 1991, for an average of 1.2 per agricultural education faculty member and 3.5 agriculture teacher graduates per institution.

Enrollments in public school agricultural education programs have declined by 25% since the late 1970s; however, the number of teachers of such programs declined by only 17%--although the number of teachers has declined steadily each year since 1979. In analyzing teacher demand with teacher supply, Oliver and Camp (1992) noted that only ten agriculture teachers were needed nationally on September 1, 1991 (p. 8).

Oliver and Camp found that graduation from an agricultural education program no longer means certification to teach, rather agricultural education is regularly used as an umbrella degree for those choosing to enter such other occupations as agricultural extension or agricultural communications. Nearly 60% of agricultural education graduates do not teach in their first year after graduation.

Business Teacher Education

Business teacher education appears to be particularly hit with program closing and teacher education decline nationally. Further, the end may not be in sight for eliminating more business teacher education programs. Luft and Noll (1993), in a survey of all 235 colleges and universities affiliated with the National Association of Business Teacher Education (NABTE), found that 34% expect their programs, within five years, to be "integrated with other teacher education programs, downsized, or eliminated" (p. 10). The authors also reported that 11 business teacher education programs had recently been eliminated [since 1986] and 16 were predicted to be eliminated within the next five years. In adding up the declines from NABTE surveys in a 10-year period (1980-1990), business teacher education lost 25% (N = 75) of its programs and may lose up to another one-third (Kaliski, 1987; Luft & Noll, 1993; Schmidt, 1985).

This may be particularly troublesome since business education comprises a relatively large share of the vocational teaching force--32% of high school vocational teachers and 24% of two-year college vocational faculty (Vocational Education Journal, 1991). Further, the high school business education teaching force is an aging one with 27% over age 50 and nearing retirement (Kaufman, 1992).

Anecdotal evidence and some data suggest that there may be a relationship between business teacher education decline and its administrative location on college campuses. Luft found that 50% of business teacher education programs were in collegiate schools of business--few of which have as their mission the preparation of teachers. An additional 18.5% were in colleges other than education. Contrary to reports of massive enrollment declines in business teacher education, Lynch (1991) found that the number of graduates from business teacher education programs had actually increased in the 3-year period from 1987-1989. However, the business teacher education programs studied by Lynch (i.e., those which were among four or more vocational teacher education programs located at one university) tended to be in colleges of education and administered with other vocational teacher education programs. In effect, some business teacher education programs may be increasing substantially--perhaps those in colleges of education; while others are being eliminated--perhaps those in business schools.

Further, Luft & Noll (1993) report that enrollment declines at 38% of the business teacher education programs caused faculty to shift into teaching computer applications and other technical courses--at the expense of further developing or reforming teacher education programs.

Home Economics Teacher Education

The numbers of programs in home economics teacher education have also declined throughout the past decades. The five year decline from 1984-1988 was from 281 to 266, a 5% decline (Hall & Miller, 1989). The authors report data from another survey that indicate at least 22% of home economics teacher educators fear program closure or elimination in the future. It is interesting to note, however, that few programs of home economics teacher education have actually been eliminated relative to closings in business and technology teacher education, especially considering their steep enrollment declines (see, for example, Hall & Miller; Kellet & Beard, 1991; Lynch, 1991).

Lynch (1991) reported a 15.4% decline in graduates of home economics teacher education programs from 1987-1989. Other more longitudinal program specific enrollment data show steeper declines than reported by Lynch. For example, Kellett and Beard (1991) report that the mean number of graduates in home economics teacher education per institution in 1975 was nearly 27. Thirteen years later, the **total enrollment** in nearly all home economics teacher education programs was less than 20 students; at 41.5% of the university programs, enrollment was fewer than ten. The average number of university-prepared teachers annually for home economics programs was less than five per institution.

Similar to faculty in agriculture, business education, and other vocational subject areas, home economics teacher educators tended to shift assignments into other areas, for example, preparation of home economists, teaching consumer- and family-relations courses, and international education (Hall & Miller, 1989).

Health Occupations Teacher Education

Little is known about the preparation of teachers for health occupations, probably because there are comparatively few health occupations teachers in secondary vocational education programs (1.6% of the total secondary vocational teaching force). Also, many health occupations teacher preparation programs are included with trade and industrial teacher education. Much like trade and industrial education, a considerable percentage of health occupations teachers come from industry (i.e., the medical professions) and are not prepared to teach through traditional teacher preparation programs. Pratzner and Ryan (1990) report that 50% of beginning health occupations teachers had not completed a baccalaureate degree.

Lynch (1991) found only 32 colleges and universities nationally that purport to offer teacher education in health occupations and only 12 of these offer preservice programs. From 1987-1989, enrollment in these 12 programs was stable, averaging about 6 graduates per year.

Industrial Arts/Technology Teacher Education
Industrial Teacher Education
Technical Teacher Education

The teacher education components of "single-subject" trade, technical, industrial programs (whatever the nomenclature) and industrial arts or technology education programs have declined considerably. McAlister & Erekson (1988) report that most university faculty hires in trade and industrial education and technology education are to teach in technical areas (CAD/CAM, manufacturing, technology) and not in teacher education. These authors indicate the shift away from teacher education programs in technology and industrial education was a result of a desire "to continue enrollments, while serving a new diversified population with different career goals" (p. 47).

Oaks and Loepp (1989) report that 30 technology-based teacher education programs (14%) were terminated at colleges and universities between 1979 and 1988. Volk (1993) comments that the terminations along with those that produce no teachers result in a real decline of 24.1%. Oaks and Loepp fear that if the closing trend continues, a resulting teacher shortage will "surely prove to be a serious problem for the technology education profession" (p. 67). Volk goes even further by speculating that if the enrollment decline continues at its present pace, "the demise of the profession will occur near the year 2005" (p. 57).

There is some evidence that there may be a cause and effect between programs that shifted from teacher education into nonteaching options. The nonteaching option, in effect, "took over." For example, Volk (1993) notes that the 20-year rate of decline for industrial arts/technology education majors was 69.7%; concomitantly, the nonteaching degrees increased by a whopping 790.0%. "This latter increase was due in great part to the explosive growth and shift in emphasis to industrial technology program options" (p. 50). Further, Volk found teaching options at colleges and universities were much more apt to be eliminated when industrial (nonteaching) options were provided.

Marketing Education

Ruhland (1993) reports that only 56 institutions currently offer an undergraduate degree in marketing education or provide marketing education certification courses. This represents a 37% decline (since 1989) in the number of colleges and universities which purport to offer specialized programs in marketing teacher education. Further, five of the 56 institutions offer only state-required marketing teacher certification courses in contrast to a bona fide program or major in marketing education and five report no graduates. Three additional programs are being phased out in the next three years and an additional three will combine business and marketing teacher preparation programs. In reality, therefore, there are about 40 marketing teacher education programs which annually graduate at least one or more marketing teachers.

Enrollments, too, from all university marketing education teacher supply sources (baccalaureate, certification option, graduate) declined by 38% in the 10-year period, 1982-1992 (Lynch, 1984; Ruhland, 1993).

The effects of decline in marketing teacher education may be similar to that postulated for business education. That is, Lynch (1991) found a slight increase in teacher education enrollment in marketing education for the 3-year period, 1987-1989, and, similar to business education, those enrollment increases were reported from programs primarily administered in colleges of education and with other vocational teacher education programs. Also, program closings in marketing teacher education were often those administered in collegiate schools of business.

Trade and Industrial Education

The preparation of trade and industrial education (T&I) teachers deviates considerably from that of other vocational education teachers. This is primarily because (a) the vast majority of T&I teachers lack the baccalaureate degree--at least at the time they enter the classroom as teachers, and (b) "the teaching content and methodology of T&I programs vary markedly from other vocational education programs" (Duenk, 1989, p. 2).

Beginning with the federal 1917 Smith-Hughes Act and continuing to the present time, nearly all states substitute years of work experience rather than college preparation for certifying T&I teachers. In fact, only Hawaii and Wisconsin require the baccalaureate degree for initial certification as a T&I teacher. Seven states require a baccalaureate degree and five states require an associate degree for full certification. Beginning teachers in 43 states may teach in T&I programs without any college credits (Duenk, 1989). Pratzner and Ryan (1990) report that 73% of beginning T&I teachers do not have a baccalaureate degree. They note that most states do require from 16 to 200 clock hours of initial pedagogical preparation concurrent with the first year of teaching. Typically, this preparation is obtained through workshops or courses that are "provided by the state department of education, a college or university, or the school system itself" (Lynch & Griggs, 1989, p. 9).

In effect, vast numbers of T&I teachers initially and continually teach in public schools and technical institutes without benefit of any formal teacher preparation from a college or university. Thus, data about and from T&I teacher education programs at colleges and universities could be misinterpreted, since a relatively small percentage of that program's teaching force enter into it at the preservice level. Lynch (1991) did identify 122 T&I teacher education programs nationwide and a very slight enrollment increase (2.2%) over the 3-year period, 1987-1989.

Vocational Special Needs

There is insufficient evidence in the literature to discuss meaningfully programmatic and enrollment data in preservice programs to specifically prepare teachers to teach vocational students with special needs. Lynch (1991) reported 98 colleges and universities purport to offer programs in vocational special needs with a 3-year average enrollment increase of 14.3%. However, few institutions provided specific data about the curriculum and structure of preservice (e.g., undergraduate) programs. It is therefore assumed that (a) a major in vocational special needs education is typically not available at the undergraduate level, (b) instruction in teaching vocational students with special needs is included as part of the professional preservice preparation of all subject-specific vocational education majors, and (c) extensive professional preparation for vocational special needs teachers is provided primarily at the graduate level.

Comprehensive Vocational Education

Studies previously reported have primarily been conducted and reported in and for subject-specific areas generally thought collectively as vocational teacher education. Some attempts have also been made to collect enrollment and programmatic data for all vocational subject areas in colleges and universities known to have several vocational teacher education programs.

Lynch (1991) collected data from universities with four or more vocational teacher education programs in the spring of 1989. Nearly 80 colleges and universities provided data on all of their vocational teacher education programs. Lynch found enrollments in undergraduate programs in vocational teacher education had declined overall from 1987 through the 1989 graduating class. Agricultural education and home economics showed especially steep enrollment declines, while technology education showed a slight decrease and trade and industrial education, marketing education, and business education showed modest increases. The largest percentage increase in enrollment was in the preparation of vocational special needs teachers.

Since July of 1985, the University Council for Vocational Education (UCVE) has published three reports and has one in press on the status of vocational teacher education in its member institutions. UCVE is currently comprised of 20 member institutions, all of whom provide research, service, teacher education, and advanced graduate study in vocational and technical education. All UCVE-member institutions offer a doctoral degree in vocational education and all but one are at land-grant universities.

Until the latest report, most UCVE institutions reported reduced demand for vocational teacher education courses (including graduate courses) both on- and off-campus on a biennial basis since the mid-1980s. However, in the latest report, enrollments at all three levels of study were reported on the upswing (Anderson, in press).

Undergraduate enrollments increased to an average of 237 per institution (an increase average of 66 students per campus, 28%). Only three universities experienced a decrease in undergraduate enrollment during the two-year period, 1990-91 and 1991-92.

It should be noted that this latest report shows significant improvements over the three previous biennial reports. Throughout the 1980s, Anderson (1991) reported that the average number of enrollments, full-time and part-time faculty, support staff, and graduate assistants declined significantly at member institutions. However, it also needs to be noted that in his latest report (in press), Anderson provides no evidence that increased enrollments and numbers of faculty are in vocational teacher education programs. In fact, the increases reported may well be a result of vocational education units expanding their courses and program offerings into nonteaching areas (e.g., training and development, cooperative extension, industrial technology).

SUPPLY AND DEMAND OF VOCATIONAL EDUCATION TEACHERS

Data and information discussed in previous sections about the current status of vocational teacher education in this country collectively lead to the conclusion that American colleges and universities have significantly diminished their commitment and capacity to produce teachers for America's vocational and technical education systems. This conclusion, then, leads to the obvious question: Will there be an adequate supply to meet the demand for vocational education teachers in the future? The answer to this question can not be answered with a simple "yes" or "no;" the appropriate response is "it depends."

Teacher demand and supply data are very difficult to validate and are fraught with great uncertainty, especially those related to supply. The demand for the total teaching force, including vocational education, may be easier to predict if we accept certain assumptions, for example: birth rates will remain relatively stable, the percentage of faculty who teach vocational subjects in high schools (currently about 20%) and postsecondary institutions (currently predicted at about 60%) will remain the same, students will continue to "demand" vocational and technical education at about the same percentage as they currently do, turnover of teachers can be predicted, etc.--in sum, these factors will remain essentially as they are now or changes can be predicted, and thus we can extrapolate numbers to predict the demand for the future.

Various authors and agencies have used some or all of these factors, sometimes supplemented with survey data, and have predicted great demand for vocational teachers in the years ahead. Data in the Vocational Education Journal (1991) for example, cited U. S. Department of Labor data as predicting better than average demand for adult, secondary, and college vocational teachers and charted predicted demand as especially high for secondary and adult instructors. Further, Kaufman (1992) reported that about 27% of all high school vocational teachers were aged 50 or over (compared, incidentally, to 18.5% of nonvocational teachers, aged 50 or over). Presumably the vast majority of these over-age-50 teachers will be retiring by the year 2000, and thus creating a high demand for their replacements.

The lead article in a recent Vocational Education Journal was entitled "Who will Teach the Teachers?" In that article, Dykman (1993) concluded, "There is little data to support a claim of a [current] vocational teacher shortage" (p. 27). However, of 37 states that responded to her questionnaire, 17 indicated a demand for teachers in certain [but not all] vocational areas. Dykman points out that anecdotal evidence and some survey data show that many states are concerned about the future as teachers retire and high school student populations begin to swell again.

But the demand for vocational education courses from students, at least at the secondary level, seems to continue to decline. The national weekly report, Vocational Training News (1994), recently reported on a federal Education Department study that vocational education track enrollments declined from about 22 percent in 1972 to 12 percent by 1992.

Supply is even more difficult to predict. As discussed in previous sections of this paper, colleges and universities simply aren't producing a large quantity of vocational education teachers. Unless there are significant changes made in our nation's colleges and universities relative to producing more vocational teachers, states will not be able to depend on them as a major supply source in the future.

But the problem of supply may be deeper than finding adequate numbers to staff classrooms. There is also the quality issue. Especially since 1984, the literature on teacher education in general has been fraught with commentary on the need to upgrade significantly the quality of the teaching force. As discussed by Lynch (1988) and placed in context for vocational education, the issue of quality seems to focus on two views of teacher education reform. One is grounded in the public perception of an "inadequately prepared, nurtured, evaluated, and compensated teaching (and related administrative and support) staff" (p. 115). The public and their state legislators simply have not felt our nation's schools were staffed with good teachers. Thus, over 1,000 pieces of legislation designed to reform teacher education were initiated by state legislative bodies in the mid-1980s (Darling-Hammond & Berry, 1988).

A second quality issue speaks to making teaching, once and for all, a respected profession. This means establishing requirements for training and entry into the field; defining the nature of the work, the structure of the job, and the authority that governs it; developing and monitoring accountability measures (i.e., through accreditation); enforcing a code of ethics, with special concern for clients; identifying a knowledge base that must be mastered by those who are to practice the profession; and preparing practitioners to exercise a high degree of autonomy--all based on interpretive and applicative knowledge. In essence, each view speaks to standards.

Finally--but closely related--what does the vocational and technical education teacher of the future need to know and be able to do? Do current teachers being produced possess the knowledge and skills needed in today's vocational and technical education classrooms? How about tomorrow's classrooms? Dykman (1993) noted that states showed need of teachers in high tech areas and then strongest in health occupations, skilled trades, and technology. However, these are not areas for which colleges and universities seem to produce teachers.

Perkins II legislation, anticipated school-to-work transition legislation, and national and state reports addressing reform in vocational education imply that teachers must be prepared, for example, to (a) implement programs of tech prep, (b) integrate academic and vocational education, (c) operate apprenticeship and other school-work connected programs, (d) serve at-risk learners effectively, (e) use computers and technology throughout the instructional program, (f) design new and innovative curriculum and instruction for the contemporary workplace, (g) provide for leadership development among students, (h) inform students of multiple career options and career paths, etc. Are current vocational teacher education programs preparing their graduates to implement these programs and practices? The data reported herein and in other recent reports and collected for other purposes answers with a simple one-word response, "No."

CONCLUSIONS

Data and information presented in this paper are part of a larger data collection and dissemination effort to inform state and federal policy groups and colleges and universities about the status of vocational teacher education in our nation's colleges and universities.

The general conclusions are that vocational teacher education has been in steep decline for the past decade, some attempts are being made to revive or reposition it on some college campuses, and that its reformation is (probably) critical to bringing about reform in our nation's delivery of work-based education. More specifically, based on the extant literature and data reviewed for purposes of this paper, the following conclusions are offered:

1. Our nation's colleges and universities have greatly diminished their capacity to prepare teachers for vocational and technical education programs. Enrollments in teacher education have declined (significantly in some subject areas), large numbers of programs have been eliminated or are defacto nonexistent, and teacher educators--although still employed at the universities--have found work other than in vocational teacher education.

   Even at universities that have retained vocational teacher education, many have phased out some programs, eliminated faculty positions, consolidated courses, transferred some programs to other colleges, and refocused priorities.

2. Many programs historically (and even today) were and are single-subject, one teacher educator programs often attached to a department where the primary mission is not to train teachers. These programs today produce few teachers and are isolated from other pedagogists engaged in the professional preparation of teachers.

3. There is some evidence that vocational teacher education programs administered in

the same unit and in colleges of education receive greater support and have experienced considerably less turmoil in terms of program elimination and enrollment decline. Programs in administrative units other than education--especially in collegiate schools of business--seem to have been hit particularly hard with program elimination.

In addition to information presented in this paper, Bott (1988) concluded that "in areas such as budgets, [programs of vocational education] in schools of education receive more support than programs in schools of engineering or technology" (p. 40).

4. Vocational teacher education programs in state-supported, land grant universities affiliated with the University Council on Vocational Education have recently experienced increased enrollment growth and increased support for program development.

5. Teacher supply and demand data are fraught with uncertainty and questionable assumptions. Nevertheless, it is doubtful that there will be a critical shortage of traditionally-trained vocational education teachers. There may be a shortage of teachers well prepared to teach in new or modified programs emanating from various education initiatives identified in Perkins II and with other work-based education reform movements. There is also certain to be a shortage of teachers trained in technology and technological applications.

6. There is not a clearly focused conceptual framework undergirding vocational teacher education in our nation's colleges and universities. The theory base, knowledge, understandings, and skills needed to teach for and about the workplace and workforce have yet to be codified into a professional knowledge base for prospective and practicing *vocational* education teachers. In effect, an answer has not been provided to the question, "What is it teachers need to know and be able to do to teach all work-bound students as

they prepare for employment in the 21st Century workplace?"

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PROPRIETARY VOCATIONAL SCHOOLS' ROLE IN ECONOMIC DEVELOPMENT: LESSONS FROM INDONESIA

Richard W. Moore

School of Business Administration and Economics
California State University, Northridge
Northridge, CA 91330-8245

The research presented here was supported, in part, by the World Bank. The opinions and ideas expressed here are solely those of the author.

Paper presented at the
American Educational Research Association Meeting
New Orleans, Louisiana
April 1994

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Abstract

Richard W. Moore

Throughout the 1980's, researchers contended that public vocational programs in developing countries were out of touch with the labor market, often failing to train people for available jobs, offering antiquated training, and contributing little to the economy's development. In response to these critiques, the World Bank and other funding agencies have begun to encourage private for-profit alternatives to formal public training systems. Despite policy makers increased focus on the private sector, little is known about the for-profit training institutions. This study examines the potential of Indonesian for-profit training centers to contribute to industrial expansion and draws implications for training policy in other countries.

PROPRIETARY VOCATIONAL SCHOOLS' ROLE IN ECONOMIC DEVELOPMENT: LESSONS FROM INDONESIA

Richard W. Moore

INTRODUCTION

Through out the 1980's researchers questioned the value of public post-secondary vocational education in developing countries. These critics contended that public programs were out of touch with the labor market, often failing to train people for available jobs, offering antiquated training, and contributing little to the economy's development (see for example Psacharopoulos, 1987 and Adams and Schwartz, 1988). These studies also raised the question of whether the public sector could ever provide a sufficient quantity and quality of training to support rapid industrialization. Research by Middleton (1988) found that by 1986 the World Bank and developing nations themselves were shifting investment away from formal vocational education, particularly at the secondary level, and towards non-formal and enterprise based training.

In response to these critiques the World Bank and other funding agencies have begun to formally encourage private sector alternatives to formal public training systems. In its recent policy paper Vocational and Technical Education and Training, the World Bank makes it clear that it views private training providers as more flexible, dynamic and market driven than bureaucratic public systems . The World Bank argues that private for-profit (proprietary) post-secondary vocational training institutions have particular potential to help developing countries achieve rapid industrialization. The bank further argues that these institutions are often overlooked in development schemes.

> Governments often overlook private training when they assess training capacity. In many countries, however, private schools and training centers -- operated as nonprofit organizations or as for-profit firms...provide a large share of skill formation, often in dynamic skill markets....
>
> Private training has much to recommend it. The use of private training capacity can often be improved simply by taking private provision into

> account in planning for skills supply. (The World Bank, 1991a pg.41.)

Despite an increasing focus on the private sector by policy makers and planners at the national and international level, little is known about the proprietary sectors in most countries. This is particularly true in the Far East, where the proprietary sector is growing explosively but has been subject to little empirical research. When the proprietary schools are included in analyses of private higher education the focus is on degree granting proprietary colleges and universities, not on the vocational training centers that make up the bulk of the proprietary sector. Examples of this focus are Geiger's (1989 pg. 62) analysis of the proprietary sector in Philippine higher education, and St. John's (1986) study of postsecondary policy in the Far East. The attention the proprietary vocational sector does receive concentrates on its marginal nature in relation to traditional higher education and raises questions about the quality of training provided, see for example Patrinos (1989).

The most sophisticated analysis of private for-profit institutions was done by James (1991) in her examination of the market dynamics of public and private higher education institutions in the Philippines. James begins by noting that private alternatives expand rapidly in response to excess demand for higher education and training which the public sector can't meet. Her analysis revealed that private profit seeking institutions do behave differently than private non-profit institutions. She found that for-profit institutions focused on offering programs where instruction was labor intensive rather than capital intensive and where programs could be offered at a relatively low cost. Low cost was essential, she observed, because students will only pay for programs from which they can see an immediate personal return.

The Indonesian Context

This study investigates the potential of proprietary vocational training centers to contribute to economic development in Indonesia.

The Indonesian economy grew rapidly in the 1980's due to a host of internal economic reforms that opened the economy to world trade. As a result non-oil exports grew, in real terms, from $4 billion in 1983 to $14.1 billion in 1989. Manufactured goods made up 90% of this growth.[1]

This rapid economic expansion lead to increased labor force participation for both men and women. In turn creating tremendous excess demand for higher education and vocational training which could not be met by public institutions. During the 1980's labor markets tightened and open unemployment declined.

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[1] Unpublished data from Indonesian Central Bureau of Statistics.

Analysts from within the Indonesian government and the World Bank have grown concerned that Indonesian workers may not have the skills to support continued expansion and, perhaps more importantly, to move to higher value-added manufacturing. Thus, limited skills within the Indonesian workforce may become a barrier to economic expansion in the immediate future.

An unpublished study by the World Bank found that while only 14% of skilled manufacturing workers had relevant pre-employment training, the largest proportion of trained workers had been trained in private proprietary vocational centers. Despite its, apparently, important role little was known about this sector. A preliminary effort to assess the quality and potential of proprietary vocational centers in Indonesia was made as part of a broader assessment of training providers by a World Bank team in 1990. The team visited a small sample of proprietary vocational centers and compared their quality and capacity with public institutions. The study found the that the center's were small and offered instruction at a basic level only, although it rated their ties to the labor market and ability to place students in related jobs as stronger than public training institutions.

The centers are only minimally regulated by the national government. The government does classify the centers into four categories based on their quality but this classification scheme appears to have little impact on either the schools or the students choice of school. No public financial assistance is available for students attending the schools. In essence the centers are pure free market organizations in which customers (students) pay with their own money for the services (training) that the centers provide.

Before the proprietary sector could be incorporated into new efforts to expand the training system more information was necessary. This paper reports that results of a large scale survey of private for-profit vocational centers[2] that offered training in industrial skills in three large industrialized Indonesian provinces; East Java, West Java and North Sumatra. The survey was conducted in the summer and fall of 1992.

The analysis presented here describes the private training centers in terms of their facilities, staff, and students, and examines the market incentives that drive them.
Based on this data it assesses the systems potential for contributing to economic development initiatives in Indonesia. Finally, based on the Indonesian experience I draw lessons for incorporating proprietary training centers into training policy in other countries.

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[2] Through out this paper "private training center" and "proprietary training center" are used interchangeably to indicate privately-owned, for-profit vocational training centers.

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METHOD

Data for this report were collected during two trips to Indonesia by the author, the first in November 1991 and the second in July 1992. During the trips in-depth visits were made to over 25 private training centers in the three provinces included in the project.

In addition, a survey of 159 private training centers and students as conducted in August and September of 1992.

Institutional Survey

The institutional survey was designed by the study team to collect data on the centers' capacity in terms of its physical plant and staff. The questionnaire asked a series of questions designed to identify the market behavior and incentives that drove the schools. Finally the questionnaire collected a limited about of data on the schools expenditures and access to capital.

In the three provinces, the study identified centers approved by either the Department of Education (Dikmas) or the Department of Labor (Depnaker) that offered training in an industrial skills area. Industrial skills programs were defined as those that trained people for jobs related to manufacturing. The programs training for hospitality and office occupations were excluded. All of the centers with industrial skills programs were included in the survey, with the exception of sewing schools and computer schools, from which we took a representative random sample of 5% of the sewing centers and 20% of the computer schools. A sample of these schools was necessary because the study lacked the resources to survey the large number of centers offering these programs.

Data were collected by enumerators from Depnaker and Dikmas trained by the study team and REDECON, a consulting firm responsible for data collection and tabulation.

The study achieved a high response rate as Table 1 indicates:

Table 1
Institutional Response Rate By Province

Province	Sample	Response	Percent of Sample
East Java	84	78	93%
North Sumatra	45	43	96%
West Java	52	38	73%
Total	181	159	88%

Student Survey

A student questionnaire was designed to collect basic demographic data, and information on how students came to choose a private training center. Student data were collected within the same set of institutions. Enumerators sampled two classes at different times of day within each school to generate a sample of over 2,600 students.

RESULTS

Characteristics of Private Training Centers

Despite the fact that private training centers trained a large proportion of the relatively few skilled manufacturing workers who had relevant pre-employment training, we found relatively few centers offered courses in industrial skills. We classified the centers surveyed by the principal area in which they offered instruction. Sewing (36%) and Computer (36%) were the most common types of schools. These numbers under-represent the preponderance of sewing and computer centers in the population because we did not include all computer and sewing schools but rather chose a sample because we did not have the resources to visit every school. A second consideration in analyzing the dominance of these two school types is that they may not really be training for industrial skills. Sewing centers have a substantial number of students who are enrolled for avocational purposes, and many computer schools principally train students for office occupations.

The remaining centers were concentrated in a few areas: electronics (13%), diesel/automotive (9%), welding (3%), company training programs (3%) and textiles (1%). An analysis of the courses offered by these schools reveals that textiles (1%). An analysis of the courses offered by these schools reveals that the most common courses are short courses offered at the basic as opposed to intermediate or advanced levels. A few centers offer comprehensive programs.

Over half the centers are less than five years old, which indicates that this sector of training is growing rapidly since it appears few centers are closing.

Table 2
Training Center Characteristics by Province

	All Provinces (N=159)	**East Java** (N=78)	**West Java** (N=43)	**North Sumatra** (N=38)
Sewing	36%	40%	14%	52%
Electronics	13	19	9	3
Computer	36	26	56	34
Diesel/Auto	9	4	21	8
Welding	3	6	0	0
Textile	<1	0	0	3
Company Training Programs	3	5	0	0
Percent of Centers Less than 5 years old	55%	44%	74%	55%
Single Site	77%	82%	65%	79%

Private training centers tend to be extremely small and autonomous. The survey revealed that the physical facility of the typical center was 265 square meters. The average capacity of the plant at one time was 120 students.

Centers that had a library reported that on average they had only 150 volumes in the library. The average school employed 3.4 full-time instructors and 4.1 part-time instructors.

Enrollment data revealed that while many schools have very small enrollments, there are a few very large schools which skew the data. For example, the average enrollment was 223 students, but the median enrollment (indicating that half the schools enrolled fewer students and half more) was only 80.

Most centers operate with complete autonomy. Eighty percent are owner operated and 77% of the school were single sites, not part of a chain of schools.

Table 3
Training Center Capacity

Factor	**All Provinces** (N=159)
Volumes in Library	150
Area of Institution Sq. Meters	265
Student Capacity at one time	124
Average Annual Enrollment	223
Median Annual Enrollment	80

As James (1988) found in the Philippines the courses[3] offered by centers are short and inexpensive, reflecting the basic level at which training is offered and low level of tuition students will pay. Indonesian centers strive to keep courses short and tuition low in order to attract the largest number of students possible. The unfortunate consequence of this market driven strategy is that the level of skill training offered is very basic. For example, the median course length was just 72 hours, and the median course fee was Rp 70,000 or about $35. A few longer, higher fee courses pull the average course length up to 109 hours with an average fee of Rp 145,000 or about $73.

Comprehensive programs, which are relatively rare, are substantially longer. These programs have a median length of 150 hours with a median fee of Rp 180,000 or $90. Again the average is substantially higher, 256 hours and an average fee of Rp 324,000 or $162 .

To put these numbers in perspective, the U.S. government considers 600 hours to be a minimum length for a comprehensive, non-degree, post-secondary vocational program in fields such as welding or auto mechanics.

As the table indicates, enrollments tend to be small. Overall the median annual enrollment in a course is only 33, and the average annual enrollment is 92, indicating that a relatively small number of courses enroll large numbers of students. Comprehensive programs as opposed to single courses have similar enrollments, with an annual median enrollment of 36 and an average enrollment of 95.

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[3] Students usually purchase one course at a time. A course is a unit of instruction that deals with a subcomponent of a comprehensive program. For example an electronics school might offer a course in basic electronics, an other course in radio repair, and an other in television repair.

Table 4
Course Length, Cost and Enrollment

	All Provinces (N=159)
Course length in hours	
Average	109
Median	72
Course Fee in Rps[4]	
Average	145,000
Median	70,000
Annual Course Enrollment	
Average	92
Median	33
Comprehensive Program Length in hours	
Average	256
Median	150
Comprehensive Program Fee in Rps	
Average	256,000
Median	180,000
Annual Comprehensive Enrollment	
Average	95
Median	36

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[4] At the time of the survey $1 US was equal to Rp2000.

Ties to Employers

Centers report that about one third of graduates end up in the wage earning sector. Overall center ties to employers seem weak. Even though our sample of centers was limited to those offering industrial skills training, we still found that centers reported on average that 29% of graduates found wage employment, while 34% were self-employed and 37% were still seeking employment. These data fit with our field observations that found that most centers, even in technical fields, focused their curriculum on servicing existing products, a job that is often done by self employed people. For example, most electronic schools focus on training people to repair consumer electronics.

While the earlier World Bank study team found private centers had closer ties to employers than public institutions, we found only limited evidence of formal programs to place students. The survey revealed that fully 29% of the centers offered no placement services at all. Of those that did offer services, less than a quarter reported that they regularly received job listings from employers.

Centers also reported doing little to prepare students for a job search. Only 10% of the centers offered interview training and only 30% offered job search training.

The most common service offered by the centers was references and personal referrals to employers which were provided by about half the centers that offered placement assistance.

Direct contracting with employers for training services was another link to industry on which data was collected. The survey showed that only 10% of centers had a training contract in the last year, and most of the contracts trained only a few employees.

Table 5
Training Centers Labor Market Ties

	All Provinces (N=159)
Percent Graduates Unemployed	37%
Percent of Graduates Found Wage Employment	29
Percent of Graduates Self-Employed	34
Percent of Centers offer Placement Assistance	71
Job Listings	23
Job Search Training	30
Interview Training	10
References & Personal Referrals	52
Training Contracts with Employers	10

Center Director and Staff Characteristics

In small entrepreneurial organizations such as these training centers, the center director plays the key role. In 80% of the centers the director is also the owner, so the director operates with virtually complete autonomy. He or she is the person who chooses programs, hires faculty, purchases equipment, and maintains relations with employers. Field work reveals that high quality centers are usually directed by an individual who either has substantial experience in the occupations taught, such as an electrical engineer directing an electronics program, or is an experienced educator.

The data from the survey reveals that roughly half the center directors have substantial experience directly related to the school's mission. For example, 50% of the directors reported that they had practical work experience in the occupations taught in the school. Twenty-nine percent reported they had taught the subjects offered in the center and an additional 28% reported they taught other subjects. Fifty-three percent reported they had a specialized certificate or license related to the subjects taught, and 20% reported related industry training.

The educational attainment of directors varied substantially. Almost half had completed a postsecondary or university degree. Interestingly, 23% reported an secondary academic diploma as the highest level of schooling completed but only 7% a secondary technical diploma. Only 6% reported that they had only a primary level of education.

Table 6
Training Center Director's Characteristics by Province

	All Provinces (N=159)
Director owns center	80%
Director has Specialized Industry Training	20%
Related Work Experience	50%
Median Years Related Work Experience	8.0
Related Teaching Experience	29%
Directors Education	
Primary	<1%
Lower Secondary	6
Secondary Academic	24
Secondary Technical	7
Secondary Business & Economics	3
Post Secondary Degree	13
University Degree	44

Overall the centers employ more part-time (an average of 4.1) than full-time (an average of 3.4) teachers. This predominance of part-time teachers is probably a function of the centers', small size, various scheduling problems and the fact that they can not pay enough to employ a skilled person full-time.

Full-time teachers report an average of seven years of related work experience and seven years of teaching experience. Full-time teachers appear more experienced than part-time teachers, by both these measures.

The average monthly salary for a full-time teacher was Rps 161,000 or about $80 U.S., which is low by international standards but not exceptionally low in comparison with salaries of public school teachers in Indonesia.

Table 7
Characteristics of Teachers
(N=159)

Average number Full-Time Teachers	3.4
Average number Part-Time Teachers	4.1
Full-Time Teachers	
Average Monthly Salary Rps	161,000
Average Years Teaching Experience	6.0
Average Years Related Work Experience	7.0
Part-Time Teachers	
Average Years Teaching Experience	3.7
Average Years Related Work Experience	5.3

Competition

While centers are market oriented, direct head-to-head competition among the schools is limited. Almost 40% of the centers report that there is not an other center in the area offering similar courses, an additional 29% report that only 1 or 2 centers offer similar programs. Further analysis shows that centers that do have direct competition are more likely to be sewing schools. Most schools that train in industrial skills areas such as welding or diesel mechanics have the market to themselves. Data from the student questionnaire indicates that almost all students (87%) live within 10 km of the school, providing further evidence that schools have little direct competition in their immediate market.

Centers did indicate that they are at least moderately responsive to shifts in labor market demand. About one fifth of the schools reported that they had added or dropped a program in the last two years. The programs most frequently added were basic computer skills, computer programming and other computer programs. The programs most frequently dropped were Radio/TV repair, welding and air conditioning.

Decisions to add courses were principally based on the owner's perceptions of what was in demand by students and employers, based on their personal contacts. They were less likely to base decisions on published labor market data.

Decisions to drop courses were based on declining enrollments or high operational costs. Centers seldom reported they dropped programs because of difficult placement or objective labor market data.

Table 8
Market Behavior
(N=159)

Other training centers in areas offer similar courses	
None	39%
1-2	29
3-4	22
5+	11
Added or dropped course in last two years	21%

Finances

Centers depend almost exclusively on tuition for revenue. Salaries, space costs and equipment make up the largest part of their expenditures.

Data on expenditures again reveal the wide variation in the size of the centers. Tables 9 and 10 show the average and median expenditures and revenues by category, and again show how a few large schools skew the average.

The average annual expenditure was only Rp 50,580,000 or about $25,265 U.S. The median was substantially lower, Rp 12,744,000 or about $6,372 U.S., once again indicating that the sector is dominated by very small schools with low levels of expenditures.

Categories that consume the largest share of a center's budget are salaries and benefits (30 - 39%), rent or mortgage (11 -14%), and instructional equipment (10-5%). Interestingly, advertising, a major expense for private schools in the U.S., accounted for only 5% or less of the expenditures. The centers also report very low expenditures on taxes, only 1%.

An analysis of revenues reported shows that centers generate between 87% and 98% of their revenues from student tuition. The only other significant source was the "other" category which probably represents sales of instructional material to students or in a few cases producing and selling goods and services at the school. A few centers generate funds through contracting with employers for training.

Table 9
Center Expenditures By Category
All Centers
(In 1,000's of Rps)

Category	Average Rps	%	Median Rps	%
Salaries, Benefits Payroll Tax	15,279	30%	5,000	39%
Rent or Mortgage	5,512	11%	1,800	14%
Utilities	2,413	5%	600	5%
Instructional Equipment	5,106	10%	645	5%
Instructional Supplies	3,203	6%	400	3%
Insurance	1,163	2%	480	4%
Advertising	2,303	5%	359	3%
Other Supplies and Equipment	5,112	10%	632	5%
Taxes	516	1%	150	1%
Improvements to Plant	4,068	8%	1,400	11%
Maintenance	1,577	3%	378	3%
Other	4,328	9%	900	7%
Total	50,580		12,744	

Table 10
Center Revenues
All Centers
(1,000 Rps)

Source	Average Rps	%	Median Rps	%
Student Fees	34,679	98%	10,062	87%
Contract Fees	73	<1%	0	0%
Other	726	2%	1,500	13%
Total	35,478		11,562	

Student Characteristics

The centers serve a diverse group of students. Students were fairly evenly divided between men (47%) and women (53%). The range in age indicated the centers served many non-traditional students. Forty-nine percent of the students were under 20 years old, 47% were between 20 to 30, and 3% were over 30.

There was also a wide variation in previous educational attainment. But, these institutions truly are post-secondary in that most students complete a secondary degree before enrolling. Interestingly 11% reported they had completed an secondary degree in a technical field. Why these students are seeking further vocational training is unclear. The largest group (43%) reported they had completed a secondary academic degree and 12% a secondary business degree. Seven percent of the students reported that they had post-secondary experience with 4% reporting they completed a post-secondary degree program, and 3% a university degree. Only a quarter of the students (23%) reported lower primary as their highest level of schooling.

Most students described themselves as full-time students. Only slightly over one-third (35%) of the student reported that they were working while attending the center.

Students usually seek training to prepare for wage earning employment but, a significant group are preparing for self employment. When asked why they were seeking training the most common answer (30%) was that the student was unemployed and need training to find their first job. This indicates that the centers are serving a large number of young job seekers. Another 22% reported that they were employed and were seeking training to advance on their current job. Smaller groups reported that they were employed and wanted a different job (14%), or that they were unemployed and wanted a different job than they had held in the past (8%).

Fully one quarter of the students reported that they sought training to prepare for self employment. This fits with observations made in the field that showed the level and type of training offered was best suited to low level repair and service jobs which are commonly done by self-employed workers in the non-formal sector.

Students as Consumers

Students do appear to "shop" among competing institutions but they choose based on information from their personal network or school advertising. Over half the students (55%) said they first learned about their center through a friend or family member. The bulk of the remaining students found out about the school through some type of advertising. Twenty-five percent said they learned about the school through the school advertising, 7% reported that they saw the center's building or sign, and 4% said they learned about it from the school staff.

Very few students reported learning about the center from other, more objective sources, such as teachers or counselors 3%, employers 2%.

Students do report that they shopped around before choosing a particular center. In fact, two thirds of the students reported they considered other training institutions. The most common alternative considered was another private training center (62%). Less frequently considered were government vocational/technical centers (17%), public colleges or universities (12%) and private colleges or universities (8%).

Earlier I indicated that centers face little head-to-head competition with centers offering similar programs in the same geographic area. The fact that so many students did consider other centers indicates that there is competition which comes principally from students choosing among various fields of instruction offered by different centers in the same area.

Students report that the most compelling reason for choosing a particular center was the quality of instruction (53%), or its affordable price (22%). Interestingly, only 11% of students said they chose a center because of its reputation for job placement. In the U.S. this is the primary reason for choosing a particular vocational school. This may indicate that students do not bring very high expectations for help with finding employment with them when they enroll. It probably also reflects the large proportion of students who are headed for self-employment.

While students report that the quality of instruction is a major factor in their choice it is not clear that government classification of centers into four categories of approval based on an assessment of quality, is used as an important indicator of quality. Many centers we visited did not even list their status on their brochures, and students interviewed did not appear to know the status of their school.

To test student's satisfaction we asked them if they would recommend enrolling in their center to a friend. Ninety-six percent of the student replied that they would. These data may reflect a cultural bias against criticizing their center, but on the other hand they may indicate that students are largely getting what they expect from the centers.

Students use resources from a variety of sources to fund their training. We asked students what was the primary way they were paying for training. Family savings was the most common source, reported by about a third of the students. About a fifth of the students reported that they were paying with their own earnings from work done while attending. Another 12% reported they were using personal savings.

Twenty percent of the students reported that some third party was paying their tuition. Five percent said their employer was paying and an additional 15% reported an unnamed third party. In our field work we uncovered a number of students who were having their way paid by missionary societies and others by government rural development programs which helped people from rural villages attend private training centers in the city.

CONCLUSIONS AND DISCUSSION

This study shows that the private profit-seeking vocational centers constitute a dynamic market driven training sector that serves a diverse group of students, however the sector's current potential for supporting industrial development is severely limited. There are relatively few centers offering industrial skills training. In many that do offer industrial skills training, the focus of the training is on self employment or employment in the service as opposed to the manufacturing sector.

Field work done for this study as well as earlier studies show that the quality of training within the centers is offered only at the most basic level. Equipment is minimal and outdated. Facilities are small and cramped. The curricula are pitched to a very basic level and aimed principally at servicing consumer goods or making minor repairs. Curriculum materials are often self produced and focus on basic skills.

Despite being free market organizations, the centers' ties to the formal labor market and employers are weak although they are probably stronger that those of similar public institutions. These weak ties may be the result of the fact that centers rely almost exclusively on student tuition and the students themselves have low expectations for placement in wage earning jobs, thus centers have little incentive to build ties with employers. Systematic placement programs are rare. Most centers rely on personal referrals by school staff for the limited placement which is done. The limited amount of contracting between employers and the schools also reveals the weak ties between centers and employers. In short, schools' ties to the labor market are weak while their ties to the market of potential students are strong.

A large proportion of students who complete training in the centers are often headed for self-employment in the non-formal sector, thus creating little incentive for centers to build ties with employers or upgrade their curriculum to industry standards.

The key barrier to improving the quality of training and increasing the number of industrial skills programs is the low level of fees students can afford to pay. The limited mix of courses and the low quality programs offered by centers are the product of a very responsive market system. Proprietary training centers design courses and programs which they believe will appeal to potential students. Students in turn select courses and centers that they can afford and which offer programs attractive to them. The average course in a center costs $72 U.S. and many cost much less, because that is what students are willing and able to pay for training. In essence students can't pay the fees required to support high quality industrial skills training programs, so they generally don't exist, just as one doesn't usually find stores selling high-quality, high-cost goods in low income neighborhoods.

A second barrier is student preferences for training in white collar occupations. The limited number and quality of industrial skills programs is due in large part to the simple fact that students in the market for training prefer training for white collar and service occupations. Centers that offer office skills programs appear, from the field work, to be larger, much more sophisticated, and have closer ties to employers. Interestingly this tracks the pattern of development in United States where proprietary schools first sprung up in the 19th century to meet the need for skilled bookkeepers and secretaries rather than industrial workers.

Center directors believe that industrial skills training is less popular with students than training in office or hospitality occupations because of low wages, poor working conditions and limited opportunities for advancement in industry. Students are unwilling to pay for training in these fields because they don't see a return. Although owners of centers that train in the industrial skills areas note that placements are easy, students who do complete often prefer non-formal work because it pays more. Conversely students are eager for training in office occupations because wages are higher and working conditions and opportunities for promotion are better.

One owner points out, for example, that students trained in rudimentary auto mechanics can only make about $1- $2 a day if employed for wages, but will make $3- $4 a day if they return to their village and are self-employed mechanics. This anecdote points out the conundrum facing policy makers. Until the economy begins to create higher wage, higher skilled jobs workers will be reluctant to invest in training. Conversely until there is some assurance of a supply of skilled workers entrepreneurs will hesitate to move into more sophisticated manufacturing.

Successful private centers are run by owner operators who have high levels of training and industrial experience in the skills they teach. Field work indicates that strong directors with substantial and often ongoing work experience in industry create the strongest, most effective centers. These directors' personal understanding of industry practices and standards translates directly into high quality programs. Their personal contacts with industry create a channel for placing students in industry. Finally we observed that centers which did contract with industry uniformly had directors with strong industry experience and background. Successful policies will have to be those that entice other people with industry experience into the training sector.

Tapping the Potential of the Proprietary sector for Economic Development

This analysis of the Indonesian experience points out that the proprietary vocational sector may not automatically produce the training needed for industrial development. While, at the same time, this private sector may hold the potential to produce needed training.

The private centers present a paradox for policy makers and planners hoping to use them to produce skilled workers needed for industrial expansion. The proprietary training centers are market driven, but the market that drives the centers is the potential students' demand for training, not the needs of employers. Proprietary centers can only sell training that potential students see is clearly in demand by employers. Thus even if demand is anticipated for air conditioning technicians, if the jobs don't currently exist students won't invest their own money in the training, because they don't see a return. Thus, centers will not offer the programs.

If jobs are available for trained applicants, centers will only offer the training if the training can be offered at a price students can afford. This effectively eliminates many capital intensive types of training such as advanced welding, machining, and industrial electronics. Schools simply can not charge enough to warrant the capital investment required for training equipment.

If jobs are available and the centers invest in equipment and charge the required high tuition, students will only enroll if the wages they will earn after training will be high enough to provide a return on the money they invested in training, and if they can find the money to pay the tuition in the first place. The low level of industrial wages in most developing countries thus discourages individual investment in training.

The dynamic is clear if you look at office occupations which where proprietary center training has flourished in Indonesia and other developing counties. In this field, capital investment required for training is low to moderate, a few personal computers, standard software and often self produced instructional texts is all that is required. Thus training can be offered at an affordable price. The number of jobs in the field are expanding rapidly. Wages are relatively high compared to industrial work and there are opportunities for promotion. Students flock to these schools seeking affordable training the will quickly lead to a well paid job with a future.

Effective training policy must take this dynamic into account when proprietary training institutions are considered. To succeed training initiatives must first be part of a larger macro-economic policy that creates incentives for higher value production, which in turn will create high level jobs and thus provide an incentive for individuals to invest in training. This study shows that private training centers can not lead economic development but will follow after they receive market signals that clearly indicate that offering industrial skills training will be profitable. Until jobs are created the proprietary sector will not respond with programs.

Training to meet the initial demand created by industrial expansion will probably have to be located within the companies themselves. The employers have the capital and the expertise to quickly train the initial cohort of workers. Later, new workers to meet the demand created by expansion or turnover may be trained by proprietary institutions if they can charge sufficient tuition to cover the cost of training, including the capital costs of starting up the program, and yield a profit. If this requires charging a tuition which is higher than most potential students can afford some provision for third party funding of training may be necessary.

A program that offered third party funding for industrial skills training could provide the resources and incentives required to produce quality skill training in a private sector setting. Besides encouraging existing programs to expand and upgrade, it would attract skilled professionals and organizations such as employer based training centers into the training market, and encourage successful private training centers that offer programs outside the industrial skills area to enter the field.

Past research documents the policy options available for subsidizing training (see for example Dougherty and Tan, 1991). Policy options include grants or loans to individual trainees, tax breaks for enterprise-based training, direct subsidies to private training centers through grants or low interest loans, and levy grant programs where designated payroll taxes are used to create a training fund.

Each of these policies alters the current market incentives under which proprietary institutions operate. The danger of third party funding is that it may remove the proprietary institutions further from the real demands of the labor market by making them dependent on government funds, and recreate in the proprietary sector the problems found in public institutions. It may also open the door to fraud and corruption. To avoid these pitfalls planners need to insure that funding programs, whatever their structure, create a set of incentives that reward institutions for providing quality training that leads directly to employment for job seekers or productivity increases and wage increases for existing workers in target industries. Models for such "performance based" training contracts exist in developed nations and have proven effective in increasing the impact of training, by making sure that training agencies focus on meeting labor market demand (Moore, 1988, Moore and Blake, 1992). Conversely funding programs that have merely paid private training providers for enrolling students, such the federal student aid program in the U.S., have lead institutions to focus on recruiting students, often at the expense of training and placement.

If jobs are available a policy that provided incentives for employers and private training centers to create joint ventures to train needed workers seems the most practical approach. Employers could supply the necessary equipment and perhaps instructors, substantially reducing the private training centers costs and risks. Training centers could recruit qualified students, provide related instruction in basic skills such as math, or electrical theory. Such arrangements would strengthen the ties between industry and training centers, increase the chance of relevant placement for graduates, build the expertise of the centers and increase the chances that public funds spent on training would yield a benefit.

The Indonesian experience reveals that incorporating proprietary training institutions into industrial development plans may well be more complex and expensive than envisioned in the World Bank Policy Paper. However market driven proprietary institutions should still prove a valuable resource dynamic enough to meet the needs of a developing economy. Policy makers need to carefully assess the capacity of the proprietary sector, analyze the incentives that drive it before attempting to incorporate proprietary training centers into development plans.

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A REVIEW OF YOUTH APPRENTICESHIP LEGISLATION AT THE STATE LEVEL

Clifton L. Smith
Department of Occupational Studies
The University of Georgia
Athens, Georgia 30602

Paper prepared for presentation at the
American Educational Research Association
New Orleans, Louisiana
April, 1994

A REVIEW OF YOUTH APPRENTICESHIP LEGISLATION AT THE STATE LEVEL

Clifton L. Smith

Over the past several years, educators, politicians, and business leaders have acknowledged the growing realization that American education does a very poor job of preparing youth to make the transition from school to employment and adult life (Grubb, 1992; Secretary's Commission on Achieving Necessary Skills, 1991; Smith and Rojewski, 1993; Stone, 1992; William T. Grant Foundation, 1988). In fact, non-college bound youth in our society receive little or no assistance in preparing for and finding employment when they complete their secondary education. Byrne, Constant, and Moore (1992) described the transition process as a "do-it-yourself" system that may affect upwards to 20 million young people who will not go directly from high school to a four-year college or university.

According to a recent General Accounting Office (1991) report, *Transition from School to Work*, many of the young people not bound for college "flounder in the labor market upon leaving school, jobless or obtaining jobs with few opportunities for advancement" (p. 2). The lack of adequate school-to-employment transition programs forces many young people to languish for several years in the secondary labor market of this country. In a recent report, the Commission on the Skills of the American Workforce (1990) summarized the treatment of adolescents who are not college bound:

> There is no curriculum to meet the needs of non-college bound youth, no real employment service for those who go right to work, few guidance services for them, no certification of their accomplishments and ... no rewards in the workplace for hard work at school. (p. 7)

A number of situations have contributed to the current situation, including the perceptions of youth toward their education, program emphases made by school personnel, hiring decisions made by business and industry leaders, and the transformation of the workplace. It is interesting that until very recently schools did not feel responsible for students once they left the classroom (Byrne et al., 1992). This lack of perceived responsibility was coupled with a singular focus on college preparation. For whatever reason, secondary schools have ignored non-college-bound youth despite the fact that less than 20% of high school graduates will receive a college diploma 5 years after their graduation.

School-to-Employment Transition

The United States lacks the kind of formal training and apprenticeship systems that other industrialized countries--such as Germany, Sweden, Switzerland, Denmark--use to help workers and to maintain their competitive edge in a global market. Workplace-based vocational and technical training is the norm in most industrialized nations. It increases relevancy, shores up employer confidence, uses more modern equipment, engages more attention and commitment from students, and provides a better setting for the socialization of new workers into the workplace.

In the European apprenticeship system, training occurs under the supervision of certified trainers and the apprentice receives an industry recognized credential. The German apprenticeship system, which is the most frequently cited system, enrolls approximately 70 percent of 16- to 18- year olds. Thus adolescents are integrated into the workplace at a young age and have extensive interaction with older worker. Upon exiting the system, the apprentice has earned a credential that has been jointly developed by industry, labor and education and is recognized throughout the country. The transition from school-to-employment is a formalized process that creates a visible link between education and employment.

In the United States, the standard apprenticeship program has been developed by the trade unions, primarily in the building and construction trades, in which a young worker is employed, usually at a low wage, to learn a craft. Training is done in phases, with examinations and pay increases marking the transitions from phase to phase. The current system serves a limited number of individuals (only 300,000 are currently enrolled) and is viewed as an adult training program, not one for adolescents. Less than twenty percent of apprentices nationwide are under the age of twenty-three, and the average age is twenty-nine (U.S. General Accounting Office, 1990).

Consequently, a school-to-employment transition model for adolescents receiving consideration by many groups (i.e., National Center on Education and the Economy, Council of Chief State School Officers, Jobs for the Future) is that the United States adopt a modified version of the European-style apprenticeship system for acclimating young people to the labor market. As envisioned, a youth apprenticeship--American style--would be a combination of academic instruction in secondary and postsecondary schools with employment-based training for students at a level of quality sufficient to certify the ability of individuals to perform entry-level tasks in skilled occupations capably and professionally.

Youth apprenticeships are anticipated to be one component of a coherent national education and training system for the United States. This is reflected in the current federal legislation, the School-to-Work Opportunities Act (HR 2884), which is encouraging states to establish a comprehensive school-to-employment system for connecting adolescents to the workplace. Its goal is to improve the way employers and schools provide learning opportunities and career possibilities for young people.

Youth apprenticeships would link learning in school with work-based learning and work experience taking place on the job, enhance academic learning and foster positive attitudes toward work. (Apling, 1992). According to Jobs for the Future, Inc. (1991) youth apprenticeship programs would combine, at a minimum, the following elements:

- work experience and guided learning opportunities for youth by employers within an industry or occupational cluster;
- structured linkage between secondary and postsecondary components of the program leading to the high school diploma, postsecondary credential, or certification of occupational skills; and,
- close integration of academic and vocational learning and of school and workplace experiences through planning and ongoing collaboration between school and industry personnel and innovations in curriculum and instructional strategies in the classroom and at work.

At the state level, as well as the Federal and local levels, interest and investigation with youth apprenticeships are continuing, despite acknowledged challenges in implementation. As noted by Hamilton (1990) "an American-style apprenticeship system cannot be created without making substantial changes in schools, communities, and workplaces, and in their mutual relations" (p. 165). To address these changes, several state legislatures have enacted legislation specifying school-to-employment policies including youth apprenticeships.

Thus the purpose of this paper is to compare and contrast the legislation passed by states in regard to youth apprenticeships. By identifying key components of state legislation concerning youth apprenticeships, and comparing and contrasting the design along several defining dimensions into a matrix should further assist in efforts to implement youth apprenticeships, research, and assessment.

METHODS

This review was undertaken, in part, to determine the current state of legislation on school-to- work transition as it relates to youth apprenticeship.

Literature Search Procedures

A first step in the document identification process involved locating specific state references that dealt with school-to-employment transition and specifically youth apprenticeships. The primary source for locating documentation was through The University of Georgia database system. Thus, state legislation comprised the primary source for data that was measured by content analysis.

A total of fifteen states was identified in the initial review. Upon inspection of the state legislation, two states were eliminated from further examination due to the limited reference of youth apprenticeship in the legislation. Thirteen states (Arkansas, Connecticut, Georgia, Illinois, Iowa, Maine, Maryland, Minnesota, New Jersey, Oklahoma, Oregon, Texas, and Wisconsin) legislation composed the analysis for this study. The legislation for each of these states is presented in Figure 1.

Arkansas	Youth Apprenticeship/Work-based Learning Act (Ark. Stat. Ann. # 6-50-53, 1993)
Connecticut	Act Concerning Technical Education (Public Act 93-376, 1993)
Georgia	Youth Apprenticeship Program (O.C.G.A. @ 20-2-161.2, 1993)
Illinois	Youth Apprenticeship Vocational Education Programs for Secondary School Students (Public Act 270, Section 2-3.115, 1993)
Iowa	Act Creating an Iowa Invests Program (1993 IA SF 268, Division III, Sec. 13)
Maine	Act to Establish the Maine Youth Apprenticeship Program (House Proposal 1135, Legislative Document 1536, 1993)
Maryland	Youth Apprenticeship Program (MD Education Code Ann. @ 18-2002, 1993)
Minnesota	Youth Apprenticeship System (MN Statute @ 126B.01, 1993)
New Jersey	Youth Transitions to Work Partnership Act (Public Law 1993, Chapter 268, 1992)
Oklahoma	Act Relating to Schools (OK Senate Bill 500, 1993)
Oregon	Youth Apprenticeship Pilot Program (ORS @ 244.745, 1991)
Texas	Workforce Development Initiative for Youth (Senate Bill 376, 1993)
Wisconsin	Youth Apprenticeship Program (WI Act 39, Statute 101.265, 1991)

Figure 1

State Legislative Documents on Youth Apprenticeship

Analysis of Data

This paper sought to categorize and classify themes, components, and suggestions emerging from current state legislation that pertained directly to youth apprenticeships.

To accomplish this purpose, a theme (or content) analysis approach was adopted. Content analysis obtains data by analyzing the content (or message) of communications in a systematic, objective, and quantitative manner to measure variables. This technique measures the extent of emphasis or omission of a given analytical category.

For purposes of this paper, statements providing direction for youth apprenticeship appearing in state legislation were viewed and analyzed qualitatively (Lynch, Schmidt, & Asche, 1988); resulting data was in the form of words rather than numbers. The author then employed an inductive coding scheme to group similar statements together and eventually classify them by common themes that emerged. These qualitative research techniques produced emic data (i.e., expressed in categories supplied by the legislation rather than researcher) that focus on definitions, meanings, and descriptions.

Limitations

All documents were qualitatively examined and thus the interpretations and final themes/categories that were derived are dependent on the perspective of the reviewer. Undoubtedly, if other reviewers were to engage in this activity, additional or different categories might be identified.

RESULTS

The described review protocol resulted in identification of seven major themes. Each major category was, in turn, analyzed for critical components (*i.e.*, subthemes) that collectively comprised the theme (*see Table 1)*. Results for each theme are examined in this section of the paper.

Insert Table 1 about here

Decision-Making Structure

State legislation has proposed a variety of governance and administration structures that provide specific representation and involvement of key departments within state government to implement youth apprenticeship programs. The strategies are an attempt to rationalize and coordinate the states' economic development, education and workforce development schemes. Thus a multi-sector governance and administrative approach shared between departments of education, labor and economic development with appropriate advisory committees composed of business and industry, union and community representatives are being stressed. State administrative structures are to provide full assistance to and facilitate efforts at the local level, usually in the form of local consortiums composed of secondary and postsecondary educational institutions and representatives of the business community.

Structured Integration

A majority of state legislation analyzed specified the integration of school- and work-based learning as a critical factor in youth apprenticeship programs. The youth apprenticeship model is embedded on an institutional connection between school-based (academic) and work-based (skill-specific) learning and is primary to program design.

Curriculum for youth apprenticeship programs, developed jointly by education and industry, with defined proficiency levels for student completion was described in a majority of the legislation. The curriculum was to be delivered at the secondary level, the postsecondary level, a business/industry site or any combination that assured satisfaction of high school graduation requirements. Participating employers would instruct youth apprentices in the appropriate workplace competencies through structured work-based learning and mentoring. The program curriculum of certain states included employability skills development and such work related skills as problem solving, critical thinking and team building. Coordination of school curricula with workplace experiences were key components to the success of youth apprenticeship as referenced in state legislation.

Students are to be awarded credit toward a high school diploma for both the school- and work-based learning components of the youth apprenticeship program and credit and/or advanced placement at postsecondary institutions was highly desirable. Thus, state legislation proposed flexibility on the part of both secondary and postsecondary educational systems to accommodate alternative paths to technical and professional competence.

Written evaluations, formal evaluation periods, assessment of academic performance, and assessment of progress in work-based learning are examples of student assessment and evaluation cited in legislation of some states. All partners in the youth apprenticeship program, including business/industry and educational institutions, are responsible for ensuring that formal evaluation and/or appropriate grading take place in the program.

Targeted Industries

Numerous state legislative acts distinguished the types of industries that should be associated with youth apprenticeship programs in the state. A broad range of businesses and industries were identified, but focused on enterprises that emphasized high-skill, high-wage jobs with good opportunities for career advancement. Specific trades, such as manufacturing and engineering were highlighted in specific state legislation. A small number of legislative acts provided incentives, usually in the form of a tax credit, to encourage employer participation within targeted industries.

Articulated Partners

Faced with the challenge of preparing youth for a future work world that requires more than mastery of basic skills, a high priority in nearly all state legislation was the development of partnerships between educational levels (secondary to postsecondary) in which a continuity of education and training opportunities are jointly planned. Some states referred to a program model that lasts a minimum of two years, with at least one year in the secondary school and one year in a postsecondary institution; while others favored programs of longer duration (i.e., three years, four years).

State legislation recognized the commitment required from business and industry in planning, developing and evaluating the youth apprenticeship programs. Coalitions between educational institutions and the business and industry community were stressed to help set occupational standards, collaborate on curriculum, participate on advisory committees, provide paid work experience and workplace instructors (mentors) for students, and to certify mastery of skills.

Recognizing the importance of the commitment of business and industry to students, definite notations were identified about the role that employers and their workers must perform in implementing youth apprenticeship programs. Strategies that were called for to help students acquire the skills they will need in the workplace included: select, employ, and train youth apprentices; organize work-based learning experiences; supervise through a structured mentoring relationship; and evaluate and report on-the-job performance.

Credentials

State legislation, for the most part, recognized that most occupations associated with youth apprenticeship programs would not require college-level (baccalaureate) education, but would require a much higher caliber of education than just a high school diploma. Thus, postsecondary education opportunities are linked to youth apprenticeship programs to enhance the prestige of education for skilled technical work with opportunities for lifelong learning and professional career advancement.

As part of the youth apprenticeship program, state legislation stressed the development of exit credentials that are recognized by specific industries and that allows portability of the credentials throughout the geographic area. Individual states called for the development of state skill standards by advisory committees for industries in which youth apprentices are to be placed, while other states have selected the option of appropriate nationally accepted standards in the specific industries and occupations for which youth apprentices are to be trained.

Access to Program

A high priority in nearly all state legislation is a stated assurance of providing equal access and opportunities for participation in youth apprenticeship programs with the focus on preparing a majority students for productive employment. There appeared to be some indication that youth apprenticeship programs, as noted in specific state legislation, should target to serve those students who are not "college-bound."

Outreach and recruitment efforts were identified as priorities in specific states to inform students that youth apprenticeship programs were available and to assure their acceptance into such programs. Development of marketing and counseling strategies for gaining interested parties' support and participation in the program was referred to in the state's legislation.

Support Systems

Certain state legislative documents recognized the need for career development activities and career guidance as part of an effective youth apprenticeship effort. Assisting students to make tentative career choices requires that local educational institutions offer career exploration activities and develop an applicable career guidance program. Some states are actively incorporating guidance and counseling activities into their program design as stipulated in specific legislation.

Along with the redesign of career development and guidance activities are recommended student services. Illustrations of the student services cited were: academic and training remediation at the school site; child care for student learners who are parents; transportation services; and financial aid packages.

SUMMARY

There is a growing interest, as evidenced in the state legislation reviewed for this study, in developing a sound system for preparing students for skilled, high-wage careers through a structured combination of school- and work-based learning. There appear to be four tenets among the states in developing youth apprenticeship programs:

1. It is an effort to improve the linkages between work and school for all students.

2. That an early orientation to work experience and opportunities for workplace learning are essential.

3. Recognized occupational standards that are the product of the alliance between education and business and industry are important.

4. Opportunities for students to further their education, if they should pursue it, after securing occupational credentials should be available.

State legislation suggests that youth apprenticeship programs should combine, at a minimum, three basic elements:

1. Work experience and guided learning opportunities provided to students by employers within an industry.

2. A structured linkage between secondary and postsecondary components of the program leading to a high school diploma, postsecondary credentials or diploma, and certification of occupational skills.

3. A close integration of academic and vocational learning and of school and workplace experiences through planning and ongoing collaboration between educational institutions and business and industry.

DISCUSSION

After reviewing state legislation on youth apprenticeship programs, many questions arise when an attempt is made to envision a full-scale recognized youth apprenticeship system. These concerns are briefly discussed here to facilitate further discussion, research, and assessment among those involved with youth apprenticeships.

1. It has been noted that youth apprenticeships should be developed in "high-skill/high-wage" occupations and/or emerging technologies and that a linkage occurs with two-year postsecondary institutions. Presently it is a parents' desire for their child to enter a four-year college and they see a college degree as the means for their child to get ahead. School counselors most often seem to share this view and direct many marginal students to higher education. Another problem is students' lack of understanding and knowledge about careers and job opportunities. For fully implemented youth apprenticeship programs to succeed the image and value of the program will need to be addressed.

2. Youth apprenticeship programs will place new demands on local educational institutions in terms of educational practices. Academic subjects will need to be integrated with work experience; role of guidance in career counseling; flexible schedules for students; role of academic and vocational teachers; and a variety of other changes that will need to be addressed to meet student and employer needs.

3. Issues facing business and industry that are only partially addressed in state legislative acts are labor issues, child labor laws, and incentives for participation. The actual implementation of youth apprenticeship programs will require negotiations between business and industry, state and local governments (and perhaps the Federal level), and unions to accommodate an employer's involvement and long-term commitment.

4. The leadership role in youth apprenticeship programs is often vague and numerous agencies are involved and their activities overlap. Though programs on the local level are desirable and easily adaptable, it is difficult for issues that require a much broader spectrum to be addressed. Central among the issues that should be addressed are state or nationally portable occupational standards and labor issues (child labor laws, worker compensation).

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Table 1

Themes and Subthemes in State Youth Apprenticeship Legislation

Themes	AR	CT	GA	IL	IA	ME	MD	MN	NJ	OK	OR	TX	WI
Decision-Making Structure													
Single state government agency	x	x	x							x		x	
Dual state government agencies				x	x	x	x	x	x		x		x
Multi-sector governance and administration			x	x	x	x	x	x	x		x		x
State advisory council for youth apprenticeships	x	x					x	x	x	x		x	x
Local level advisory council for youth apprenticeship	x												
Structured Integration	AR	CT	GA	IL	IA	ME	MD	MN	NJ	OK	OR	TX	WI
Academic instruction and work-related learning	x	x	x	x	x	x	x	x	x	x	x	x	x
Curriculum based on industry standards		x	x		x	x	x	x	x		x	x	
Academic credit			x	x		x		x	x		x	x	
Student assessment and evaluation	x		x		x	x	x				x	x	x
Targeted Industries	AR	CT	GA	IL	IA	ME	MD	MN	NJ	OK	OR	TX	WI
High skill/high-wage occupations	x	x	x		x	x	x	x	x			x	x
Emerging technologies industries/occupations							x						
Manufacturing and engineering technology			x	x									
Administration and office technology			x										
Health care			x										
Incentives for business/industry participation		x							x		x		

Table 1 (continued)

Themes	States											
	AR	CT	GA	IL	IA	ME	MD	MN	NJ	OK	OR	TX	WI
Articulated Partners													
Secondary/postsecondary institutions	x		x			x	x	x	x	x			
Higher education (4-year) institutions									x				
Educational Institutions and business/industry	x	x	x	x	x	x	x	x	x	x	x	x	x
Business/Industry and student	x	x			x			x	x			x	x
	AR	CT	GA	IL	IA	ME	MD	MN	NJ	OK	OR	TX	WI
Credentials													
Credentials or Certificate of Occupational Skills	x	x	x			x	x	x	x	x	x	x	x
Credentials or Certificate of Academic Skills	x		x	x	x			x	x			x	x
Associate degree (or usable credits)	x		x			x	x	x					x
Occupational credentials based on skill standards		x				x	x	x			x	x	x
	AR	CT	GA	IL	IA	ME	MD	MN	NJ	OK	OR	TX	WI
Access to Program													
Equal access and opportunity	x	x	x			x	x	x	x		x	x	x
Promotion and recruitment			x					x					
Targeted participants	x									x	x	x	
	AR	CT	GA	IL	IA	ME	MD	MN	NJ	OK	OR	TX	WI
Support Systems													
Career Exploration/Development Activities						x		x			x	x	x
Career Guidance and Counseling					x			x	x		x		x
Student Services	x		x				x		x			x	

Basic Skills Important for Beginning Vocational Education Teachers: A Transportability Study

Richard J. Tannenbaum, Michael Rosenfeld, and Charles J. Teryek

Educational Testing Service, Princeton, New Jersey

Running head: BASIC SKILLS FOR VOCATIONAL EDUCATION TEACHERS

Paper presented at the annual meeting of the American Educational Research Association Vocational Education Special Interest Group

April 1994, New Orleans, Louisiana

Abstract

This study examined whether or not the 55 test-specification statements for the Praxis I: Academic Skills Assessments Computer-Based Tests (CBT) and the Praxis I: Pre-Professional Skills Test (PPST) were judged to be important for entry-level vocational education teachers, regardless of their specialty area. Judgments of importance were obtained from 2,347 vocational education teachers from 11 specialty areas. A cut point of a mean of 3.00 (moderately important) was used to differentiate unimportant ($\underline{M}$ < 3.00) statements and important statements ($\underline{M} \geq 3.00$). The results indicated that the means for all 55 test-specification statements exceeded the cut point for all specialty areas. The authors concluded that the test-specification statements for the Praxis I: CBT and the Praxis I: PPST are appropriate for entry-level vocational education teachers, regardless of their specialty area.

Basic Skills Important for Beginning Vocational Education Teachers: A Transportability Study

It is widely recognized that the skill base of America's work force must be elevated if businesses are to remain competitive in an increasingly international market (Carnevale, Gainer, & Meltzer, 1990; Dertouzos, Lester, & Solow, 1989; Johnson & Packer, 1987). Many companies have discovered that the available work force is ill-prepared to perform necessary job functions. Basic work-place skills such as reading, writing, and computation that, in the past, may have been taken for granted, are no longer certainties.

A conservative estimate is that more than 20 million workers cannot read, write, compute, or solve problems well enough to participate effectively on the job (Ropp, 1989). According to figures provided by the U.S. Department of Education, the functionally illiterate account for 30% of unskilled workers, 29% of semiskilled workers, and 11% of all managers, professionals, and technicians (Goddard, 1987); 45 million Americans are believed to be functionally illiterate (Zuckerman, 1989).

It is clear that the lack of work-place-literacy skills is pervasive. It is also clear that the cost of work-place illiteracy to organizations and to society is prohibitive. Torrence and Torrence (1987) estimate that the cost of functional illiteracy, in terms of lost productivity, is in excess of $6 billion annually. And Goddard (1987) quotes Sherman Swenson, chairperson of B. Dalton Bookseller, as stating that adult illiteracy is costing the country $225 billion annually in unrealized tax revenues, welfare, and crime, as well as lost productivity.

As a result of a less than ready work force, companies have had to assume the responsibility of training their entry-level workers in basic skills. This cost was reported to be $200 million in 1986; the cost was projected to increase to $300 million in 1989 (Carnevale & Gainer, 1990). And John Sculley, chief executive officer of Apple Computer, has stated that American industry spends in excess of $25 billion a year on remedial training (Carlivati, 1990). The significance of these figures is reflected by estimates that 22% of all major employers offer basic training in reading, 41% offer training in writing, and 31% offer training in arithmetic (American Society for Training and Development, 1990).

Vocational Education

The need to ensure the basic-skills competency of entry-level workers is an issue of major concern to professionals involved in vocational education (Kraska, 1991; Pritz, 1988). As a primary source of entry-level workers, vocational education programs are increasingly integrating occupationally specific training with training in basic academic skills (Bottoms, 1992;

Grubb & Kraskouskas, 1993; Pritz & Davis, 1990). Vocational education teachers are, therefore, expected not only to address the technical skills of their students, but also to address the basic-skills competency employers expect of these students. For example, in the state of Florida home economics teachers are expected to integrate the teaching of reading, writing, and mathematics into their homemaking and consumer economics courses (Crabtree & Maltby, 1982).

An important result of this continuing movement toward integrating vocational and academic education is the need to ensure the presence of vocational education teachers who are, themselves, well versed in, and prepared to teach, basic academic skills. In fact, in a survey of vocational education professionals, "how to teach vocational teachers to ensure that vocational students get instruction in the basics" was identified to be a critical issue facing vocational teacher education (Zellner & Parrish, 1986). Relatedly, a survey conducted by Pratzner (1987) revealed that beginning vocational education teachers receive very little preservice preparation for teaching basic skills. Pratzner concluded that competency testing seemed desirable to help ensure that preservice vocational education teachers, themselves, possessed the requisite basic academic skills.

Testing Basic-Skills Competency

Currently, Educational Testing Service (ETS) offers two assessments of a beginning teacher's basic-skills competency -- The Praxis I Academic Skills Assessments Computer-Based Test (CBT) and the Praxis I: Pre-Professional Skills Test (PPST). The former is computer-adaptive; the latter is delivered in paper-and-pencil format. These assessments are designed to determine if a prospective teacher possesses basic reading, writing, and mathematics skills. The assessments are to be given during the sophomore year of education. By taking the assessments at this point in time, there is ample opportunity for a candidate to receive additional instruction before entering a teacher education program.

To support this instructional initiative, a computer-delivered package, LearningPlus™, is available. The content of LearningPlus™ is linked to the reading, writing, and mathematics basic skills covered in both the CBT and the PPST. It includes a diagnostic component to identify basic skills in which the candidate could benefit from instruction, 20 to 30 hours of instruction in each basic skill, and practice tests that provide candidates with feedback about their readiness to take either the CBT or the PPST.

Developing Test-Specification Statements

The test-specification statements for the CBT and the PPST are based on the results of a 1991 national job analysis study of reading, writing, and mathematics skills important for all entry-level teachers, regardless of subject area or grade level taught (Tannenbaum & Rosenfeld, in press).

In that study, more than 2,200 elementary, middle, and secondary school teachers from across the country responded to a mail survey that included 78 statements defining reading, writing, and mathematics skills believed to be important for all entry-level teachers. These skill statements were developed by several committees of teachers, teacher educators, and state administrators. The surveyed teachers judged the importance of each basic-skill statement using a 5-point rating scale -- "Regardless of the subject area or grade they teach, how important is it that all entry-level teachers be able to do the following?" The scale values were: 1 (of no importance), 2 (of little importance), 3 (moderately important), 4 (very important), and 5 (extremely important).

Mean importance ratings were computed for subgroups of teacher respondents defined by: sex; race/ethnicity; teaching experience; subject taught (business and vocational education, social sciences, mathematics and computer science, physical and biological sciences, language arts); school setting (urban, suburban, rural); school level (elementary, middle, secondary); and geographic region. Basic-skill statements judged to be important across all teacher subgroups (26 in total) were then used to develop the test-specification statements for the CBT and the PPST. Fifty-nine basic-skill statements were judged to be important; and from these basic-skill statements, 55 test-specification statements were developed. Examples of test-specification statements are: Reading -- determine the main idea or gist of a reading selection; Writing -- organize ideas effectively and logically; and Mathematics -- solve problems using estimation.

The Present Study

The American Vocational Association (AVA) represents 13 specialty areas: (a) Administration, (b) Agricultural Education, (c) Business Education, (d) Employment and Training, (e) Guidance, (f) Health Occupations Education, (g) Home Economics Education, (h) Marketing Education, (i) New and Related Services, (j) Special Needs, (k) Technical Education, (l) Technology Education, and (m) Trade and Industrial Education. This range of specialization within the field of vocational education was not included in the 1991 job analysis study. Because the purpose of that study was to identify a core of basic skills important for all entry-level teachers (i.e., K - 12), no attempt was made to determine the importance of the basic-skill statements for subspecialties within any of the surveyed subject areas. As a result, it is not known if the developed test-specification statements for the CBT and the PPST are considered to be important by vocational education teachers across the various specialty areas.

Purpose

The purpose of this study was to determine if the test-specification statements for the Praxis I: Academic Skills Assessments Computer-Based Tests (CBT) and the Praxis I: Pre-Professional Skills Test (PPST) are judged to be important for all entry-level vocational education teachers, regardless of specialty area. That is, are the specification statements transportable?

Method

The 55 reading, writing, and mathematics test-specification statements for the CBT and the PPST were mailed, in survey format, to a large sample of vocational education teachers (see the survey sample section). One week after the initial mailing, a postcard was mailed reminding the teachers to complete and to return the survey. Consistent with the 1991 job analysis study, the surveyed vocational education teachers were asked to use the following rating scale to make their judgments of importance -- "Regardless of the subject area or grade they teach, how important is it that all entry-level vocational education teachers be able to do the following?" The scale anchors ranged from a low of 1 (of no importance) to a high of 5 (extremely important).

The survey also contained a section that asked the vocational education teachers to describe their demographic characteristics (e.g., specialty area that they teach, academic degree, sex, race/ethnicity, state in which they teach). The demographic information was used to describe the characteristics of the survey respondents and to conduct the appropriate statistical analyses.

Survey Sample

A sample of 5,610 vocational education teachers was randomly selected from the membership of the AVA. This sample represents the random selection of 510 vocational education teachers from each of 11 specialty areas. (Two specialty areas, Administration and New and Related Services, were not included in the sample. These two areas are primarily concerned with administration and not with the teaching of vocational education.) This sample size was chosen to ensure that a sufficient number of vocational education teachers from each of the 11 specialty areas would be represented and was based upon an expected response rate of between 40% and 50% (typical of previous surveys conducted of other subject areas).

Analyses

Mean importance ratings for each of the 55 test-specification statements were computed for the aggregate of the 11 specialty areas. This analysis provides an overall summary of the distribution of mean importance ratings. Mean importance ratings were also computed separately for each of the 11 specialty areas. This analysis supports the primary objective of the study by "flagging" any statements not judged to be important across the specialty areas. Lastly, product-moment correlations of the profile of mean importance ratings for the 11 specialty areas were computed. Correlations provide an indication of agreement among the specialty areas in terms of the relative importance of the test-specification statements. This analysis produced a matrix of 55 correlations. The arithmetic average (Fisher-Z transformed) of these 55 correlations was computed to provide a summary index.

Criterion of Transportability

A test-specification statement was judged to be transportable if respondents from 9 of 11 specialty areas judged it to have a mean importance rating greater than or equal to 3.00 (moderately important). Agreement among respondents from 9 of 11 specialty areas represents a statistically significant majority; and a mean value signifying moderate importance comports with the language of the Standards for Educational and Psychological Testing (AERA et al., 1985).

Results

Response Rate

Of the 5,610 surveys mailed to the vocational education teachers, 2,347 were returned and coded for data analysis; 75

additional surveys were returned but not coded for data analysis. These 75 surveys were either (a) not received by the intended vocational education teacher because of an invalid mailing address, (b) not responded to because, e.g., the survey recipient was retired or not a teacher of vocational education, or (c) not returned to ETS within an 8-week time period, the operational cutoff for accepting survey responses. The response rate, adjusted for the 75 unusable surveys, was 42%. As noted above, this response rate is consistent with those of other surveys conducted by ETS of knowledge and skills important for entry-level teachers.

Frequency Distributions by Specialty Area

The number and percentage of survey respondents by each of the 11 specialty areas are presented in Table 1. More than 2,000 respondents identified themselves by 1 of the 11 specialty areas (132 identified themselves by the Other category). Business Education (*n* = 249), Trade and Industrial Education (*n* = 247), Home Economics Education (*n* = 244), and Health Occupations Education (*n* = 227) were represented by the largest number of respondents. Employment and Training (*n* = 85) was represented by the smallest number of respondents. All of the 11 specialty areas, nonetheless, had a sufficient number of respondents for the necessary statistical analyses to be conducted.

Table 1

Frequency Distributions by AVA Specialty Area

Specialty Area	N	%
Agricultural Education	180	8.4
Business Education	249	11.6
Employment and Training	85	4.0
Guidance	141	6.6
Health Occupations Education	227	10.6
Home Economics Education	244	11.4
Marketing Education	184	8.6
Special Needs	152	7.1
Technical Education	121	5.7
Technology Education	179	8.4
Trade and Industrial Education	247	11.5
Other	132	6.2

Demographic Make Up of Survey Respondents

Not all respondents supplied complete demographic information. The reported percentages are based, therefore, on the total number responding to the particular demographic item. The largest percentage of respondents (62%, n = 1,409) had more than 10 years of teaching experience. Females constituted 55% (n = 1,283) of the respondents. The majority were White (85%, n = 1,942). More than half (55%, n = 1,250) had either a master's degree or a master's degree plus additional credit. Seventy-eight percent (n = 1,825) worked either in the central or southern regions of the country.

Overall Distribution of Mean Importance Ratings

The means for the 55 test-specification statements were computed for the aggregate of the 11 specialty areas. All the means exceeded 3.50 (midpoint between moderately important and very important). There were 23 statements (42%) with a mean importance rating between 3.50 and 4.00; and there were 27 statements (49%) with a mean importance rating between 4.00 and 4.50. The mean for five statements exceeded 4.50. These five statements, in descending order of importance, were: (a) Writing -- delineate the steps in a process or procedure (M = 4.68); (b) Reading -- determine the main idea or gist of a reading selection (M = 4.66); (c) Reading -- use the table of contents, selection headings, index, and similar sections of a book to locate information (M = 4.61); (d) Writing -- organize ideas effectively and logically (M = 4.56); and (e) Reading -- locate important ideas in a reading selection and explain why these ideas are important (M = 4.52).

Mean Importance Ratings by Specialty Area

Appendix A includes the mean importance ratings for each of the 55 test-specification statements by each of the 11 specialty areas. All 55 statements received mean importance ratings above

3.00 by respondents from all 11 specialty areas. In fact, 98% of the mean ratings (593 out of 605) were above 3.50 (midpoint between moderately important and very important).

Correlation of Profiles of Mean Importance Ratings by Specialty Area

The intercorrelation matrix for the 11 specialty areas is presented in Appendix B. The correlations ranged from a low of .55 to a high of .95; the average correlation (z-transformed) was .84. All 55 correlations were statistically significant (p <.01). The results of the correlational analysis indicate a high level of agreement among the 11 specialty areas in terms of the relative importance of the test-specification statements.

Conclusion

The purpose of this study was to determine if the test-specification statements for The Praxis I Academic Skills Assessments Computer-Based Test (CBT) and the Praxis I: Pre-Professional Skills Test (PPST) were judged to be important (appropriate) for entry-level vocational education teachers, regardless of the specialty area in which they teach. It may be concluded from the results of this study that the test-specification statements are, indeed, appropriate for entry-level vocational education teachers, regardless of their specialty area. The CBT and the PPST may, therefore, be considered for use by states to document the basic-skills competency of their entry-level vocational education teachers. Additionally, the 55 reading, writing, and mathematics specification statements may serve as a guide for the development of a basic-skills curriculum for the preservice training of vocational education teachers.

The results of this study also point to a further closing of the perceived gap between the competencies expected of teachers of students in college preparatory programs and teachers of vocational education students. Where, historically, it has been expected that teachers of college preparatory students needed both subject-specific knowledge and basic-skills competency, generally there did not seem to be the same expectation of teachers of vocational education students. The fact that the results of this study support the outcomes obtained by Tannenbaum and Rosenfeld (in press) indicate, however, that the same basic-skills competency is now believed to be appropriate for all entry-level teachers, whether they are involved in college preparatory programs or vocational education programs.

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Appendix A

Mean Importance Ratings by Specialty Area

	AE N = 180	BE N = 249	EM N = 85	G N = 141	H N = 227	HE N = 244	M N = 184	SN N = 152	TC N = 121	TG N = 179	TR N = 247
I. **READING**											
A. Understanding the content of a reading selection											
1. Determine the main idea or gist of a reading selection	4.59	4.70	4.54	4.71	4.76	4.77	4.70	4.68	4.59	4.62	4.50
2. Locate important ideas in a reading selection and explain why these ideas are important	4.36	4.57	4.46	4.65	4.63	4.66	4.61	4.55	4.43	4.38	4.37
3. Identify accurate paraphrases or summaries of ideas in a reading selection	4.03	4.24	4.11	4.38	4.39	4.48	4.28	4.23	4.04	4.02	3.95
4. Determine the supporting ideas in a reading selection: ideas, details, or facts that support the author's main idea	4.05	4.19	4.09	4.35	4.30	4.35	4.22	4.22	3.98	3.94	3.95
B. Understanding the argument of a reading selection											
5. Recognize the presence of an argument in a reading selection	3.80	3.93	3.86	4.14	3.88	4.15	4.00	3.85	3.83	3.73	3.69
6. Determine whether facts or ideas are relevant to an argument in a reading selection	4.05	4.05	4.01	4.19	3.95	4.27	4.09	3.96	3.94	3.86	3.82
7. Identify logical assumptions on which the author bases the argument in a reading selection	3.86	3.92	3.89	4.14	3.88	4.10	4.02	3.87	3.86	3.66	3.69
C. Understanding the implied content of a reading selection											
8. Perceive what is implied rather than directly stated by the author and make inferences from the directly stated content of a reading selection	3.67	3.86	3.89	3.99	3.81	4.03	3.93	3.95	3.59	3.64	3.61
9. Distinguish between what a writer presents as fact from the writer's opinions	4.15	4.26	4.18	4.34	4.17	4.42	4.37	4.33	4.13	4.13	3.97

Note. AE = Agricultural Education; BE = Business Education; EM = Employment and Training; G = Guidance; H = Health Occupations Education; HE = Home Economics Education; M = Marketing Education; SN = Special Needs; TC = Technical Education; TG = Technology Education; TR = Trade and Industrial Education.

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	AE N = 180	BE N = 249	EM N = 85	G N = 141	H N = 227	HE N = 244	M N = 184	SN N = 152	TC N = 121	TG N = 179	TR N = 247
10. Recognize or predict ideas or situations that are extensions of what has been presented in a reading selection	3.82	3.84	3.85	4.04	3.94	4.11	4.02	3.96	3.74	3.72	3.61
D. Understanding the organization of a reading selection											
11. Understand how a reading selection is organized (e.g., compare and contrast, problem and solution, description)	3.63	3.76	3.87	3.92	4.01	4.03	3.94	3.70	3.74	3.70	3.62
12. Use the table of contents, selection headings, index, and similar sections of a book to locate information	4.53	4.62	4.49	4.65	4.75	4.69	4.55	4.65	4.55	4.55	4.51
13. Arrange the ideas in a reading selection into an outline, a concept map, or into some other form of graphic organizer	3.85	3.91	3.95	4.08	4.12	4.15	4.05	3.97	3.93	3.89	3.81
14. Identify the relationships among ideas directly stated in the reading selection (e.g., relationships of cause and effect, and sequence)	3.85	3.88	4.05	4.17	4.19	4.25	4.15	4.05	3.87	3.88	3.87
15. Locate the place in a reading selection where a specific ding of information can be found (e.g., The author mentions the gestation period of ducks in paragraph?)	4.06	4.05	3.99	4.25	4.28	4.24	4.02	4.26	3.79	3.91	3.96
E. Understanding the way in which language is used in a reading selection											
16. Recognize and identify different interpretations that can be made of the same word, sentence, paragraphs, or reading selection	3.67	3.82	3.95	3.96	3.98	4.05	3.97	3.77	3.58	3.67	3.57
17. Recognize how the meaning or a word, sentence, or paragraph is affected by the context in which it appears	3.90	4.13	4.13	4.18	4.24	4.23	4.16	4.05	3.79	3.93	3.81

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18. Understand the function of key transition indicators in a reading selection (e.g., "however", "by contrast", "in conclusion")	3.77	3.93	3.91	3.97	4.05	4.02	4.00	3.87	3.66	3.65	3.64
F. Understanding other features of a reading selection											
19. Compare or combine ideas or information found in two or more sources	4.10	4.11	4.10	4.26	4.28	4.30	4.35	4.16	3.96	4.03	3.89
20. Identify inconsistencies or differences in points of view in a reading selection or two or more such selection	3.98	4.00	4.02	4.17	4.18	4.29	4.14	4.00	3.84	3.90	3.73
21. Specify appropriate reference sources for locating a specific kind of information (e.g., for synonyms, use of a dictionary or thesaurus; for information about the weather, use a newspaper or almanac)	4.14	4.36	4.15	4.30	4.41	4.33	4.37	4.27	3.98	4.08	3.92
22. Understand reading materials with various writing styles and various difficulty levels	3.66	3.77	3.81	3.90	4.01	4.00	3.96	3.93	3.52	3.57	3.48
II. WRITING											
A. Composing Skills											
23. Describe an event or situation	4.40	4.38	4.43	4.40	4.39	4.47	4.48	4.39	4.23	4.21	4.11
24. Delineate the steps in a process or procedure (e.g., explain how to do something)	4.55	4.65	4.73	4.74	4.76	4.76	4.75	4.72	4.66	4.69	4.53
25. Support a position for or against something	4.20	4.05	4.17	4.37	4.08	4.35	4.29	4.10	3.75	3.97	3.87
26. Analyze ideas and information in various ways	4.23	4.17	4.46	4.48	4.36	4.49	4.43	4.32	4.14	4.25	4.20
27. Provide a clear focus or thesis	4.11	4.21	4.31	4.40	4.24	4.36	4.29	4.21	4.12	4.13	3.95
28. Produce and develop supporting material that explains or illustrates key ideas	4.07	4.19	4.22	4.37	4.30	4.38	4.32	4.25	4.17	4.04	4.05

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29. Organize ideas effectively and logically	4.49	4.64	4.64	4.62	4.62	4.68	4.59	4.58	4.50	4.46	4.40
30. Use vocabulary appropriate to the purposes of writing and the audience addressed	4.36	4.62	4.53	4.66	4.66	4.65	4.55	4.54	4.36	4.34	4.21
31. Present ideas in writing in an imaginative way	3.71	3.61	3.57	3.72	3.66	3.85	3.83	3.56	3.51	3.53	3.39
32. Present alternative points of view in writing	3.86	3.66	3.53	3.81	3.74	3.95	3.87	3.65	3.37	3.49	3.40
B. Editing and Revising Skills											
33. Recognize basic grammatical errors in standard written English	4.27	4.71	4.17	4.54	4.47	4.60	4.45	4.44	4.13	4.22	3.95
34. Recognize effective sentence structure free of problems	3.83	4.18	3.82	4.04	3.91	4.11	3.98	3.81	3.86	3.78	3.58
35. Recognize language that creates an inappropriate and/or inconsistent tone, given the intended audience and/or purpose for writing	3.96	4.25	3.93	4.14	4.23	4.31	4.10	3.97	3.78	3.88	3.70
36. Revise sentences to correct basic problems in standard written English	4.13	4.59	4.17	4.54	4.42	4.52	4.40	4.37	4.07	4.06	3.80
37. Revise paragraphs to create appropriate and consistent tone, given the intended audience and purpose for writing	4.06	4.36	4.07	4.26	4.18	4.33	4.22	4.15	3.88	3.99	3.77
38. Revise paragraphs to clarify meaning	3.91	4.23	3.99	4.22	4.08	4.20	4.11	4.05	3.94	3.95	3.76
III. **MATHEMATICS**											
39. Recognize the position of numbers in relation to each other	4.38	4.47	4.60	4.59	4.48	4.41	4.49	4.57	4.47	4.47	4.40
40. Recognize equivalent forms of a number, including square roots and powers of a number	3.70	3.41	3.72	3.82	3.26	3.37	3.35	3.68	3.93	3.87	3.73

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	AE N = 180	BE N = 249	EM N = 85	G N = 141	H N = 227	HE N = 244	M N = 184	SN N = 152	TC N = 121	TG N = 179	TR N = 247
41. Demonstrate an understanding of the characteristics of counting numbers, including prime, even or odd, and multiples or factors	3.90	3.86	4.18	4.06	3.84	3.92	3.92	4.00	4.07	4.06	3.92
42. Perform computations in problem solving situations, and adjust the result of computations as required by the problem	4.42	4.28	4.35	4.43	4.09	4.32	4.37	4.37	4.31	4.38	4.14
43. Select a sequence of operations that could be used to solve a problem; demonstrate an understanding of fundamental algorithms or procedures	3.87	3.66	3.98	3.86	3.60	3.82	3.71	3.99	4.00	4.02	3.75
44. Solve problems using estimation	4.28	4.10	4.22	4.37	3.78	4.22	4.08	4.27	4.15	4.24	4.11
45. Interpret and apply ration, proportion, percent, and simple probability	4.42	4.07	4.13	4.35	4.09	4.23	4.13	4.19	4.21	4.32	4.18
46. Recognize the relationships among the variables and/or constants in an equation or formula	3.82	3.69	3.83	3.93	3.56	3.69	3.71	3.71	3.93	3.93	3.83
47. Write and/or simplify expressions using variables; write and solve simple equations and inequalities; recognize equations and inequalities representing situations presented in words	3.83	3.63	3.82	3.96	3.54	3.76	3.71	3.64	3.91	3.94	3.72
48. Read and interpret information contained in various kinds of graphs, charts, and tables	4.41	4.36	4.46	4.55	4.13	4.51	4.55	4.60	4.35	4.46	4.24
49. Demonstrate an ability to analyze and summarize numerical data	4.19	4.21	4.34	4.34	3.85	4.24	4.38	4.19	4.29	4.21	4.03
50. Demonstrate an understanding of average (arithmetic mean) and range of a set of data; given the inappropriate definition determine or interpret the median or mode of a set of data	4.02	4.01	4.08	4.26	3.80	4.07	4.04	3.95	3.91	4.03	3.81
51. Recognize patterns and spatial relationships	3.76	3.58	3.96	4.06	3.58	3.99	3.71	3.98	3.87	3.95	3.77

Note. AE = Agricultural Education; BE = Business Education; EM = Employment and Training; G = Guidance; H = Health Occupations Education; HE = Home Economics Education; M = Marketing Education; SN = Special Needs; TC = Technical Education; TG = Technology Education; TR = Trade and Industrial Education.

	AE N = 180	BE N = 249	EM N = 85	G N = 141	H N = 227	HE N = 244	M N = 184	SN N = 152	TC N = 121	TG N = 179	TR N = 247
52. Determine length, perimeter, area, and volume of common two and three-dimensional geometric figures	4.38	3.47	4.02	4.23	3.37	3.93	3.47	4.16	4.16	4.36	4.08
53. Understand and use various systems of measurement, including the metric and U.S. customary systems; make conversions within the same system or convert units from one measurement system to another using a conversion table	4.04	3.57	3.93	4.15	4.18	3.94	3.55	3.97	4.08	4.38	4.06
54. Interpret sentences containing logical connectives (and, or, if-then) and quantifiers (some, all, none)	3.80	3.85	3.87	3.96	3.80	3.94	3.72	3.83	3.76	3.90	3.64
55. Draw conclusions; use deductive/inductive reasoning to determine whether a conclusion based on a sequence of statements is valid; identify counterexamples to inappropriate conclusions	3.97	3.87	4.01	4.17	3.83	4.10	3.94	3.98	3.92	4.01	3.76

Note. AE = Agricultural Education; BE = Business Education; EM = Employment and Training; G = Guidance; H = Health Occupations Education; HE = Home Economics Education; M = Marketing Education; SN = Special Needs; TC = Technical Education; TG = Technology Education; TR = Trade and Industrial Education.

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Appendix B

Intercorrelation Matrix for Specialty Areas

Specialty Area	1	2	3	4	5	6	7	8	9	10	11
1. AE											
2. BE	.74										
3. EM	.86	.80									
4. G	.90	.88	.92								
5. H	.64	.87	.74	.80							
6. HE	.77	.93	.82	.91	.91						
7. M	.73	.93	.83	.86	.88	.95					
8. SN	.90	.85	.93	.95	.79	.88	.84				
9. TC	.87	.68	.89	.85	.58	.66	.65	.86			
10. TG	.91	.62	.87	.84	.55	.63	.58	.85	.95		
11. TR	.91	.67	.91	.88	.65	.70	.67	.89	.95	.95	

Note. AE = Agricultural Education; BE = Business Education; EM = Employment and Training; G = Guidance; H = Health Occupations Education; HE = Home Economics Education; M = Marketing Education; SN = Special Needs; TC = Technical Education; TG = Technology Education; TR = Trade and Industrial Education.

ATTITUDES OF VOCATIONAL EDUCATION SERVICE PROVIDERS TOWARDS DISABLED PERSONS WITH IMPLICATIONS FOR DEVELOPING APPROPRIATE LEARNING ENVIRONMENTS

James W. Trott Jr., Elwood F. Holton III, Mark Holden
School of Vocational Education, Louisiana State University

During the past two and one half decades significant progress has been made in improving the access of disabled persons to educational services. The Vocational Education Act of 1963 (P. L. 88-210) was the first major federal legislation to specifically address the needs of the mentally retarded segment of the disabled population. The 1968 Amendments to the Vocational Education Act were enacted, in part, because the original act had resulted in few opportunities for the handicapped (Pittman, 1978). The 1968 Amendments required that states spend 15% of their basic grants to provide vocational programs for the disabled (Phelps, 1976). Despite these new mandates, Pittman (1978) reported that the 1974 United States Committee on Labor and Public Welfare expressed concern that the handicapped were not yet receiving appropriate vocational education services.

Public Law 94-142, the Education for All Handicapped Children Act of 1975 affirmed the services to be available to all individuals between the ages of 5 and 22. Later amendments to Public Law 94-142 provided funding for model programs, including vocational programs, to meet the special education needs of handicapped students. **Honig v. Doe**, in affirming that each student with a physical or mental disability should have a meaningful opportunity to secure an education under the Education of the Handicapped Act, is perhaps the most important court decision for disabled students.

In vocational education, the Carl D. Perkins Vocational and Technical Education Act of 1984 (P.L. 98-524) continued several features of its predecessors in it's intent to fund supplemental programming to continue a highly prescriptive fiscal mechanism targeting and groups with special needs.

The most recent piece of legislation having implications for vocational education and employers is the Americans with Disabilities Act of 1990 (P.L. 101-336). Linthicum, Cole, & D'Alonzo (1991) note that most life roles that are important in the career development of individuals with disabilities are affected by the Americans with Disabilities Act (p. 1). The scope of this act is broad and deep. In employment, it extends the projections of section 504 to all public and most private sector employment.

These legislative mandates clearly suggest that those in vocational education will to continue to play critical roles in the education of the disabled, in both pre and post employment settings. In spite of this, Weisgerber, Dahl, and Appleby (1980) report that there is still some "resistance" among both general and vocational educators. McGettigan

(1985) makes a similar observation however he uses the term 'something like alienation' rather than 'resistance' (p. 17). Weisgerber, Dahl, and Appleby report the "resistance" to be due primarily to:

1. a feeling of personal responsibility that most vocational educators have about the safety of their students when they are working with power equipment or are otherwise exposed to some type of hazard.
2. an unwillingness of vocational educators to compromise on standards of achievement or alter the course completion requirements to reflect individual differences.
3. the impact of handicapped enrollments on job performance and placement.
4. lack of vocational educator's knowledge about and experience with the handicapped.
5. lack of aggressiveness by the handicapped in obtaining assignment to vocational classes (p. 65).

Of these five factors, the first four are teacher-related, dealing with attitudes and experience. This is consistent with the findings of McGettigan (1985) that vocational teachers' needs tended to cluster around support needs, suppliers of support, methods of support, and modes of service delivery chosen by teachers (p.7). Specifically McGettigan concluded that attention directed toward themselves, opportunities for one-on-one group sessions, and seminars on selected topics were apt to produce a behaviorally positive change in vocational teachers.

Special educators tend to agree that attitudes manifested toward the disabled impact on the disabled person's self-image (Patton 1979). Brant (1979) notes that a receptive attitude within the vocational education mainstream is essential. Summarizing previous research, she concludes that demographic variables such as age, sex, education and religion have not been shown to be reliable predictors of attitudes while educators having more experience with disabled students tend to have more positive attitudes (p. 30). McDaniel (1982) notes that positive educator attitudes are essential for successfully integrating the disabled into the vocational education process and must be better understood. This study addressed these concerns.

Purpose of the Study

More specifically, this study addressed two research questions:

1. What were the attitudes of post-secondary vocational service providers who are Directors, Student Personnel Service Officers (SPSO's) or Instructor's towards persons with disabilities as measured by the Attitude Toward Handicapped Individual (ATHI) scale?
2. Were their significant differences within this group on selected demographic factors?

Methodology

Population and Sample

The target population of this study was Directors, SPSOs, and Instructors from the 52 postsecondary vocational-technical schools in Louisiana. The population was determined by the Louisiana Vo-Tech Directory (1985-86) published by the Department of Education, Office of Trade and Industrial Division.

These three subgroups of professionals were selected because they have the greatest potential for impact on delivery of vocational education services to handicapped individuals. Directors set school policy and, through leadership styles, set school climate. SPSOs determine entrance eligibility, counsel students regarding continuance in given programs, and directly assist students in job placement. Instructors interact with disabled students on a daily basis and are directly responsible for meeting individual needs.

Each subgroup was random ordered with a representative random sample drawn from each using the formula developed by Robert V. Krejcie and Daryle W. Morgan (1970). By randomly ordering each subgroup, alternates were readily available in the event that individuals in the original respective samples were unavailable. Sample sizes for the populations were the following:

1. from a population of 44 directors, a sample of 39 was selected;

2. of 45 SPSOs, a sample of 40 was drawn; and
3. from the population of 856 instructors, 268 were chosen.

Instrumentation

The attitudinal measure used in this study was the Attitudes Toward Handicapped Individuals (ATHI) scale (Lazar, 1973). The ATHI is designed to measure the level of a person's acceptance of individuals with handicapping conditions. It contains 20 items using a six point Likert-type scale for each item. The instrument is considered to be reliable because of the many studies done to determine the reliability and validity of the instrument (Horne, 1980). For this study, a Cronbach's alpha reliability coefficient of 0.81 was obtained.

The score of the ATHI ranges from 0 to 120. Lazar (1973) suggested a score of 70 to be the criteria for having an accepting attitude toward the disabled. Thus, a score higher than 70 represents an accepting attitude with higher scores representing more accepting attitudes.

Data were also collected on six demographic variables: sex, age, race, previous experience with the handicapped, years experience in a vocational-technical setting, and education level.

Data Collection

A cover letter, an ATHI questionnaire, and a Demographic Data Form were distributed by mail to the drawn sample. Included in each mailing were a stamped, self-addressed envelope and instructions for returning the completed forms. Postcard reminders were sent by mail to those who did not respond within two weeks. A second survey packet was mailed to the instructors who had not responded to the follow-up card.

The total response rate was 91%. For the SPSOs, 40 responses were received for a usable responses rate of 100%. Regarding the Instructors, 249 responses were received with 241 usable responses for a response rate of 90%. Finally, 36 useable responses of 38 returned resulted in a 92% response rate for Directors.

Analysis

The differences by demographic variables were analyzed using one-way analysis of variance and independent sample t-tests as appropriate. Where significant main effects were found at the 0.05 level for the ANOVA, two-way analysis of variance and post-hoc tests were used to further clarify the nature of the differences.

Results

Attitude towards disabled individuals

A positive attitude toward the disabled is achieved by having a score of 70 or greater. The means, standard deviations, and number of respondents for each group are presented in Table 1. The entire group of vocational education service providers as well as the three individual groups had positive attitudes with means in the low 80's. However, the standard deviations are somewhat high (SD = 13.7-16.7) indicating wide variability in attitudes. No significant differences were found in attitude toward the disabled between Directors, SPSOs and Instructors.

Table 1 - Mean ATHI score

Group	Mean	SD	n
Total	81.2	16.1	317
Director	82.8	13.7	36
SPSO	84.8	14.2	40
Instructor	80.4	16.7	241

Demographic characteristics of the sample

Demographic characteristic are presented in Table 2. Approximately 90% of the directors are male, a little more than half of the SPSOs are male, and about two thirds of the Instructors are male. Almost all were white with the percent white being 86%, 80%, and 85% for the Directors, SPSOs, and Instructors respectively. For the education level, almost all of the Directors were evenly split between having a Master's degree or more than a Master's degree. About three fourths of the SPSOs had more than a Master's degree while a little less than three fourths of the instructors had some college or a bachelor's degree. About half of the directors and almost 80% of the instructors have less than 15 years experience in a vocational-technical setting, while a little more than half of the SPSOs have 6 to ten years experience. Finally, concerning experience with persons with disabilities, a little more than half of the directors had between 6 and 15 years experience, about half of the SPSOs had between 6 and 10 years experience, and about three fourths of the instructors had less than 10 years experience.

Differences in attitude by demographic characteristics

ATHI scores by demographic characteristic and position are also shown in Table 2. Significant main effects were found from one-way ANOVA analysis for all but two demographic variables. No significant interaction effects were found for any variable in the two-way analysis of variance.

Sex Females had a more positive attitude towards handicapped individuals than males for the total group t=3.57 (p<.01) and instructors t=4.13 (p<0.01).

Age Differences in ATHI score did exist by age group for the total group F=4.06 (p<.01), as well as for each service provider group with the ANOVA results being Directors F=5.31 (p<.01), SPSO F=2.71 (p<.05), and Instructors F=2.58 (p<.05). A post-hoc Tukey analysis determined that within the total group, those age 35 to 43 had a more positive attitude than those who were age 53 to 60. For the directors, those of age 44-52 had a more positive attitude than those ages 53 to 60 or ages over 60.

Table 2: ATHI Score by Demographic Characteristics

Item	Total				Director				SPSO				Instructor			
	$\bar{X}$	s	n	%	$\bar{X}$	s	n	%	$\bar{X}$	s	n	%	$\bar{X}$	s	n	%
Sex																
Male	79.0	16.3	211	66.6	82.7	13.6	33	91.7	86.0	16.0	21	52.5	77.2	16.6	157	65.1
Female	85.7	14.8	106	33.4	84.0	18.0	3	8.3	83.4	12.3	19	47.5	86.3	15.3	84	34.9
Age Group																
26 - 34	81.5	16.0	41	12.9	–	–	–	–	77.6	10.9	5	12.5	82.1	16.6	36	14.9
35 - 43	84.9	15.7	103	32.5	79.9	14.6	10	27.8	[illegible]9.0	11.5	21	52.5	84.4	16.0	72	29.9
44 - 52	82.0	17.1	88	27.8	91.2	9.2	13	36.1	82.9	17.3	10	25.0	79.9	17.7	65	27.0
53 - 60	75.5	13.6	64	20.2	77.9	12.0	11	30.6	67.3	10.1	3	7.5	75.4	14.1	50	20.7
60 and above	76.4	19.2	21	6.6	64.0	4.2	2	5.6	102.0	-	1	2.5	76.4	19.3	18	7.5
Race																
Black	79.7	18.1	48	15.1	87.8	11.9	5	13.9	80.0	14.5	8	20.0	78.5	19.6	35	14.5
White	81.5	15.8	269	84.9	82.0	14.0	31	86.1	85.9	14.1	32	80.0	80.7	16.2	206	85.5
Education Level																
High School	78.4	16.3	7	2.2	–	–	–	–	–	–	–	–	78.4	16.3	7	2.9
Postsec/Tech	71.8	21.5	15	4.7	–	–	–	–	–	–	–	–	71.8	21.5	15	6.2
College Courses	78.4	16.8	94	29.7	–	–	–	–	–	–	–	–	78.4	16.8	94	39.0
Bachelor's	81.9	16.0	82	25.9	87.0	9.9	2	5.6	–	–	–	–	81.7	16.2	80	33.2
Master's	83.4	13.9	50	15.8	82.5	14.5	17	47.2	87.1	13.0	10	25.0	82.4	14.0	23	9.5
More than Master	85.0	14.4	69	21.8	82.6	13.9	17	47.2	83.9	14.7	30	75.0	88.3	14.7	22	9.1
Years Experience in Vocational Setting																
1 - 5	81.9	18.9	70	22.1	78.7	15.4	3	8.3	87.6	14.6	8	20.0	81.3	19.7	59	24.5
6 - 10	83.2	14.8	116	36.6	90.3	16.0	6	16.7	94.0	13.8	21	52.5	82.5	15.0	89	36.9
11 - 15	81.3	15.9	59	18.6	87.3	13.4	10	27.8	80.5	18.3	6	15.0	80.0	16.1	43	17.8
16 - 20	80.2	15.9	33	10.4	85.7	11.9	3	8.3	93.7	15.6	3	7.5	78.1	15.9	27	11.2
21 - 25	80.6	12.7	21	6.6	88.0	6.7	5	13.9	80.5	2.1	2	5.0	77.9	14.4	14	5.8
25 or more	68.1	12.6	18	5.7	70.4	8.9	9	25.0	–	–	–	–	65.8	15.7	9	3.7
Years Experience with Disabled																
0	78.9	18.4	65	20.5	88.5	17.7	2	5.6	77.0	28.3	2	5.0	78.7	18.4	61	25.3
1 - 5	81.8	16.2	107	33.8	78.4	15.6	7	19.4	89.4	12.5	12	30.0	81.0	16.5	88	36.5
6 - 10	82.8	14.1	75	23.7	83.6	14.2	9	25.0	82.3	13.3	20	50.0	82.7	14.6	46	19.1
11 - 15	81.6	16.7	37	11.7	84.8	14.8	11	30.6	87.3	21.9	4	10.0	79.0	16.9	22	9.1
16 - 20	80.5	13.9	18	5.7	82.0	-	1	2.8	79.0	–	1	2.5	80.5	14.8	16	6.6
21 - 25	86.7	12.6	9	4.7	89.7	7.6	3	16.7	79.0	–	1	2.5	86.4	16.3	5	3.3
25 or more	65.8	16.2	6	–	73.0	10.4	3	–	–	–	–		58.7	19.7	3	–

The post-hoc Tukey test failed to detect any differences between age groups for the SPSOs. To get some indication as to where the differences might lie, a Fisher's Least Significant Difference (LSD) test was used because it is a slightly less conservative but acceptable test where simple contrasts are examined

(Keppel, 1982). The test found differences between those SPSOs ages 53 to 60 and those of ages 35 to 43 and ages over 60. Finally, for the instructors, the Tukey post-hoc test detected differences in ATHI score between those who were between ages 35 to 43 and those ages 53 to 60.

Years experience in a vocational/technical setting There were differences in the ATHI score between years of experience in a vocational technical setting for the total group and the directors. For the directors, those with more than 25 years experience had a significantly lower ATHI score, F=2.82 ($p<.05$), than those with 6 to 10 years experience. Concerning the total group, those with more than 25 years experience had significantly lower ATHI score, F= 2.85 ($p<.05$), than those with less than six, six to ten, and eleven to fifteen years experience.

Education level Differences were found for the total group and for the instructors sub-group. For the entire group and the instructors, those with post-secondary/technical level of education had a significantly lower ATHI score, F=2.70 ($p<.05$) and F=2.32 ($p<.05$), than those with more than a Masters degree or higher.

Race No differences were found for the total group or any sub-group.

Years of experience with disabled persons No differences were found for the total group or any sub-group.

Discussion

This study is particularly significant because it utilizes a statewide sample, making generalizability strong, and it utilizes a random sample with a very high response rate. From a practical standpoint, this study is important because it focuses on post-secondary vocational service providers who are receiving increasing attention as a means to enhance the competitiveness of America's workforce. Given that higher scores are more desirable, these results will help vocational educators meet the requirements of new federal mandates, develop positive learning environments and plan in-service interventions.

Overall, the total group as well as the Director, SPSO and Instructor sub-groups reported positive attitudes toward the disabled. However, important differences were found among different demographic groups with age being the most notable. For the total group and all three sub-groups, younger instructors reported better attitudes than did older instructors. This was the only demographic variable where significant differences were found in total and for each sub-group. This contradicts Brant's (1979) findings that age is not a reliable predictor, though there have been mixed results in previous research.

Females reported better attitudes toward disabled persons than did males in the total group and among instructors. There have been mixed findings on gender differences in previous research, though many previous studies tend to agree with these findings (McQuilken, Freitag & Harris, 1990).

Years in a vocational-technical setting also revealed significant differences between those with less that 15 years experience and those with more than 25 years. This is consistent with the age related differences found.

Equally important is what was not found to be significant. Contrary to previous research summarized by Brant (1979), experience with the handicapped had no impact on attitudes. Further research is needed to determine how experience can affect attitudes and what type of experiences are most beneficial. Also, no differences were found by race but it should be noted that the sample is mostly white.

These results suggest that differences in attitudes toward disabled are more a function of deeply entrenched values related to gender and age than they are to actual experiences working with the disabled or working in a vocational-technical setting. These values were not altered by working with the disabled or gaining more experience in a vocational-technical setting.

The implications of these findings are many since they go against commonly held beliefs. For example, one strategy that many administrators might use to enhance the learning environment for the disabled might be to give instructors experience or exposure by assigning them to work with the disabled. These results suggest that this strategy will not work. Similarly, one might be tempted to assign more experienced instructors, thinking that they would have better attitudes. Again, these results do not support that strategy.

What is supported by these findings is using education to change attitudes. Those respondents with a master's degree or higher reported significantly more positive attitudes than those with a post-secondary or technical degree for the total group and for instructors. These differences clearly suggest that what is needed is carefully targeted training to improve attitudes of some service providers. If vocational educators are to meet legislative mandates by developing appropriate learning environments for the disabled then in-service training is needed.

In-service training interventions have been shown to be effective in changing vocational teachers' attitudes toward the disabled (McGettigan, 1985; McDaniel, 1982). McDaniel (1982) in studying four different delivery vehicles designed to change (make more positive) vocational teachers' attitudes toward the disabled, notes that vocational teachers and administrators confront new challenges when addressing the needs of the disabled. McDaniel, citing a study by the United States Office of Education that found that only 3% of all vocational education teachers had completed courses on the special needs of disabled students, notes that these groups are often ill prepared to create the proper learning environment for the disabled. McDaniel reported a generally negative attitude by vocational educators toward the disabled student and suggested that a lack of training in this area might possibly account for the reported attitude.

Both McDaniel (1982) and Wood & Seyfarth (1985) found inservice education to be very effective in developing positive teacher attitudes towards disabled students. McDaniel in examining other delivery methods reported inservice workshops and undergraduate and graduate special needs courses to be most effective. However the infusion of special needs information into regular courses did not produce a significant change in teacher attitudes. These studies reported teacher attitudes could be positively impacted through appropriately designed programs of instruction, further supporting our finding that training must be carefully targeted. McGettigan (1985) further recommends that vocational school directors and superintendents need to be visible to and solicitous of the vocational teaching staff well beyond the routine administrative function. He goes on to note that special needs personnel, pupil personnel staff, and guidance and supervisory staff play key roles in encouraging and reinforcing vocational teachers in the development of positive attitudes towards and learning environments for the disabled.

The results of this study suggest that it would be particularly important to provide training to male and older instructors, older directors who have long tenure in the vocational/technical setting and SPSOs. Further analysis would be necessary to be sure the training is appropriately designed.

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CONTRIBUTIONS OF VOCATIONAL EDUCATION TO EDUCATIONAL REFORM AS PERCEIVED BY VOCATIONAL EDUCATION POLICY INFLUENCERS

Larae Anne Watkins

Comprehensive Vocational Education Program
The Ohio State University
Columbus, Ohio 43210

Paper presented at the
American Education Research Association Meeting
New Orleans, Louisiana
April, 1994

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Larae Anne Watkins

"Educational reform" has become the descriptor for the wide-ranging changes taking place in education today. While studies have documented educational change, the components and factors of change, and the impact of local level educational reform pilot projects, macro level issues regarding system-wide directions have been largely left to speculation and philosophizing. Vocational education, as one facet of the total educational system, has been conspicuously removed from much of the rhetoric surrounding educational reform (Asche, 1991).

Even though seemingly absent from broad-based educational reform, vocational education as a field and a focus of research is reforming and redefining itself. Lewis (1990) contends that the core of that field is work, and vocational education will "come to be defined as education aimed at the *preparation of people for a working life*" (p. 13). This definition ties closely with educational reform literature, which emphasizes preparing students for work life as a major function of the broadened educational system. In "Toward a New Paradigm" (p. 13) for vocational education, Lewis proposes a model for research assuming work as the focus of vocational education and the concepts work, occupations, labor markets, pedagogy, curriculum, context, ecosystem, clientele, and management as its anchors.

Currently available data from the field of vocational education is limited with respect to the evolving redefinition of vocational education. Some activity to define vocational education within the context of reform is taking place. Vocational education research has limited history in this type of endeavor; "traditional vocational research has tended to serve intrinsic ["what is best for the individual student"] goals" (Asche, 1991, p. 8).

As Frantz and Miller (1990) state:

> As the profession moves from the known to the unknown, it is imperative that contemporary issues and trends be identified and analyzed with respect to their implications for developing new policies and improving the practice of vocational and technical education. (p. i)

As vocational education moves into "the unknown" of educational reform, a systematic study of those who will influence the future of vocational education, via related policy, within the context of educational reform was lacking. The lack of a knowledge base concerning the perceptions vocational education policy influencers have of the future of vocational education holds the potential for unnecessary duplication or elimination of vocational education programs and practices which serve the interests of the reform movement and the redefinition of vocational education. This study endeavored to fill that gap in knowledge by addressing the following objective: to explore and describe those programs, activities and directions for the future which are the most critical components of vocational education given the reform of education, as perceived by vocational education policy influencers.

PERSPECTIVES/THEORETICAL FRAMEWORK

This study is based in theoretical framework of change and educational change, and the literature related to educational reform and vocational education reform. Educational change theories support the statement of Frantz and Miller. Fullan's theory of educational change (1982), which is supportive of the statement, holds that many factors influence adoption and implementation of change. Among these factors are the existence and quality of innovations, access to information, advocacy from administrators, new legislation, and the characteristics of the change itself, i.e., the need and relevance of the change. Key policy influencers, who figure directly into several of these factors and are not often assisted by vocational education or vocational education research, provide vision and direction for the future regarding educational reform and vocational education. More than information is needed by these key people; "'intelligence, which goes beyond information'" is needed (Kaestle, 1993, p. 23).

The literature related to educational reform is diverse and extensive, documenting over a decade of reforms and initiatives (Darling-Hammond, 1990; Futrell, 1989; O'Looney, 1993). The concurrent redefinition of vocational education as a field and a focus of research has shared in some of these initiatives. Lewis' concepts of context and management include policy concerns associated with a broadened function for the educational system; however, "one of the major implications of educational reform may be an increased need for policy-relevant types of vocational research" (Asche, 1991, p. 8). Additionally, "vocational education research is significant if it is nontrivial and if it contributes directly or indirectly to...improving the human condition" (Swanson, 1991).

METHODOLOGY

To explore these directions, a panel of vocational education policy influencers nominated by leaders in the field participated in a three-round, modified Delphi study (Helmer, 1966; Linstone & Turoff, 1975). These panelists included individuals influential in state and federal vocational education related policy who hold positions at state, national and federal levels both inside and outside of education and public service. In accordance with the findings of Dalkey (1972) on response reliability and Delphi panel size, nineteen selected individuals agreed to participate in the study. Fifteen completed all three rounds. The selected group of panelists was mailed the first survey instrument which contained a number of literature-based items. Initial items dealt with educational reform, vocational education, curriculum, school organization and management, governance structures, and assessment systems. Panelists were asked to agree or disagree with each item as a component of vocational education's contribution to the reform of education in the future, indicate how certain they were of their position, and provide a rationale for their position. The opportunity to suggest additional items, and provide a rationale for their inclusion in future rounds, was given to panelists.

Panelists' responses were tabulated to ascertain if a pre-determined statistical consensus was reached on each item. Agreement/disagreement and certainty scores were transformed into a single certainty-scale value which represented the panelist's response to the item (Lux, 1993; Wolins & Dickinson, 1973). When 80% of the certainty scores fell around the mean agreement/disagreement score on an item, consensus was judged to have been achieved for that item. In the case of consensus around a mean certainty value between +/-2 or a standard deviation larger than 3.5 scale units, the item was included in successive instruments. Items on which consensus (either in agreement or disagreement) was not reached were repeated on the second round instrument. Panelists were provided with the percentage of panelists in agreement and disagreement with each continuing item, their response from the previous round, summarized comments from the previous responses, and additional items suggested by panelists on the second round instrument.

This process was followed in the second round, employing the same procedures for determining consensus and developing the Round 3 instrument. Following the return of the Round 3 instruments, consensus calculations were made by implementing the same procedures and all remaining items characterized with descriptive statistics.

Final round statistics included mean certainty values, which were calculated for each item. Along with these statistics, variability was described through standard deviations for those items on which consensus was and was not achieved. These statistics have been deemed appropriate for use as accurate descriptive statistics with the Delphi technique (McCampbell & Stewart, 1992).

Final comments were also reviewed and synthesized to further describe the panelists responses to each item. Common themes accompanying a given item were described and presented along with the statistical description for that item.

FINDINGS

Consensus among experts is not easily achieved, and this study proved to be no exception. The results of this study represent the collective opinion of a selected group of vocational education policy influencers at the time of this study; care must be taken not to construe their perceptions as that of the entire field of vocational education. However, their perceptions at this point in history give insight into the condition of vocational education within the context of educational reform as the turn of the century approaches.

Fifty-one items were considered by panelists; 20 items were posed on the original instrument and 31 were added by panelists. Consensus-agreement was achieved on 29 of these items; consensus-disagreement was achieved on one. Consensus-agreement items ,included student-focused programs/activities (e.g., "Apprenticeship programs," "Tech-prep," "Career guidance"), general teacher-focused activities/programs (e.g., "Teacher inservice"), system/coordination issues (e.g., "Joint participation..."), and the focus, goals and philosophy of education and vocational education (e.g., "development of...workplace knowledge"). Consensus-disagreement was reached on "School choice programs (i.e., vouchers)." A complete listing of all consensus items is found in Table 1.

Items not achieving consensus included specific teacher activities (e.g., "Increased academic requirements..."), and items which had unclear/ multiple definitions (e.g, "'Comprehensive' vocational education," "re-think program evaluation"). Nonconsensus items are listed in Table 2.

Table 1. Consensus items following 3 delphi rounds

Original Items	Panelist-suggested Items
Preparation of students for a productive work life	Postsecondary vocational education and the employment and training system
Development of students' workplace knowledge	Alternative teacher education strategies
Alternative assessment programs	Integration of vocational and academic education
School choice programs (i.e., vouchers)*	Tech prep
Apprenticeship programs	Certificate of initial mastery
Entrepreneurship education programs	Teacher inservice
Outcome-based instruction	Research
Site-based management programs	Coalitions
Career guidance programs (beginning at the primary grade level)	Knowledgeable leadership
Preparation of special needs students (as defined in the Perkins Vocational and Applied Technology Education Act) for a productive worklife	Experience based learning in context
Vocational education as a content area of education	Focus on learners - "talent developers"
Joint participation of vocational educators and other educators in determining the direction of reform	Purpose of school is workplace oriented
Articulation programs	Schooling is community-based
	Lifelong learning is a primary goal of education
	Elimination of the general education track
	Pre-service preparation of educators

* consensus-disagreement

Table 2. Nonconsensus items following 3 delphi rounds

Original Items	Panelist-suggested Items
Vocational education as one of the principle goals of the reformed educational system	Dropout prevention
Vocational education as a subset within the educational system	Secondary/postsecondary distinction and coordination
Revision local governance structures	"Comprehensive" vocational education
Revision state governance structures	Increased academic requirements/ credentials for vocational teachers
Revision the federal governance structure	Re-think program evaluation - use proactive measures
National education standards, as called for in the High Skills or Low Wages and Learning a Living national reports	Focus on work rather than jobs at the K - 12 level
Specific occupational preparation	Employer and union involvement
	Reward and incentive system for teachers and administrators
	State-of-art facilities
	Local, state and federal funding
	Citizen/Community advisory committees
	Technology education
	Systemic change
	Value of vocational training
	Implement waiver programs at all levels

DISCUSSION

The three rounds of the Delphi yielded both agreement and disagreement, and a wide range of rationale behind each position. Clear definition of items was critical; those items achieving consensus had clearly understood meanings or meanings clarified through the Delphi process. The bulk of the consensus items dealt with programs and activities; items focusing on directions seemed more difficult on which to reach agreement. Consensus and nonconsensus will be discussed separately.

Items Achieving Consensus

Items which achieved consensus included a wide range of programs, activities and directions. Items fell into four broad categories: specific programs/activities for students, specific activities/programs for teachers, system and coordination issues, and the focus, goals and philosophy of education and vocational education.

The largest number of the consensus items were program/activity oriented; the majority of those were student-focused programs that currently exist to some extent (e.g., apprenticeship programs, career guidance programs, tech prep, articulation programs). Two newer student-focused initiatives being put forward in educational reform literature, certificates of initial mastery and alternative assessment programs, also received support from the panel.

Programs for teachers were less prominent, and the items were stated as generalities (pre-service preparation of educators, teacher inservice). Several teacher-related activities discussed in the literature received consensus; these included alternative teacher education strategies and site-based management.

System and coordination issues were also less likely to have achieved consensus; those that did (joint participation of vocational educators and other educators in determining the direction of reform, postsecondary vocational education and the employment and training system, integration of vocational and academic education, coalitions) were action-oriented, involved collaboration with people and institutions beyond the traditional sphere of vocational education, and are widely supported in literature.

The focus, goal and philosophical items appeared to support the other consensus items. The "focus on learners" was evidenced in the array of programs deemed critical; "experience based learning in context" is seen in the nature of many of these programs. The concept of work was the foundation of three consensus items: development of students' workplace knowledge; preparation of students (including special populations) for a productive work life; purpose of school is workplace oriented. Supporting the consensus items addressing coordination, the item "schooling is community-based" spoke to the system concerns. Underlying all of the items was the idea that "lifelong learning is a primary goal of education," which achieved consensus the first time it was presented to panelists.

Several consensus items were more pronounced for the comments made by panelists than for the subject of the item. The item "knowledgeable leadership" brought comments of "needed but lacking in voc. ed.,"and "Its [sic] crucial that we have knowledgeable leadership for the complex programs we are carrying out. Leadership not now in place." The item "research" was responded to with "all worthy initiatives should be well grounded in research...,"and "we need relevant research than can be applied. too much of what's going on is related to the 'publish or perish' requirement of Higher Ed faculty -- the application, transfer of knowledge is not here."

Panelists were not as definite about some items as others. The most certain consensus was with the items "Preparation of students for a productive work life" and "Integration of vocational and academic education," both of which are espoused frequently in current literature. In contrast, "vocational education as a content area of education" barely achieved consensus, and from the comments of panelists, could have been given a variety of meanings.

One item achieved unanimous consensus in disagreement. Panelists did not consider "school choice programs (i.e., vouchers)" a critical component. The comments indicated major concerns with the concept of vouchers and the impact of choice on equity, quality, and the educational system.

Items Not Achieving Consensus

The items not achieving consensus also displayed commonalities. Specific activities with regard to teachers (increased academic requirements/ credentials for vocational teachers, reward and incentive system for teachers and administrators) and coordination (employer and union involvement) were moving toward but did not reach consensus in three rounds. Items which seemed to have unclear or multiple definitions to many panelists (e.g., secondary/postsecondary distinction and coordination, "Comprehensive" vocational education, re-think program evaluation - use proactive measures, systemic change) also did not achieve consensus.

Two items suggested by panelists, "technology education" and "dropout prevention," did not achieve consensus; but comments pro and con indicated that these were deemed the responsibilities of the broader system of education, not just vocational education. On the goal and philosophy level, panelists could not achieve a unified opinion with regard to "vocational education as one of the principle goals of the reformed educational system" and "vocational education as a subset within the educational system." In the case of former item, positions seemed to be polarizing, making this more of an issue. Panelists also could not agree on the items "focus on work rather than jobs at the K - 12" or "specific occupational preparation." Positions also appeared to be polarizing on the item "specific occupational preparation."

The lack of consensus on some items also seemed to be contrary to items which did achieve consensus. For example, consensus was achieved on some system related items (including comments on the need for a national level employment and training policy) while no consensus was achieved on the need for revision of any of the educational governance structures, either local, state or federal. Consensus on the item "preparation of special needs students (as defined in the Perkins Vocational and Applied Technology Education Act) for a productive worklife" as being critical contrasts with no consensus being achieved on the item "dropout prevention," which serves a group considered to be a special population. While the item "certificate of initial mastery" was considered a critical component, the "national education standards, as called for in the High Skills or Low Wages and Learning a Living national reports" did not achieve consensus as being critical.

IMPLICATIONS

As educational change literature holds, the programs, activities and directions explored in this study are "multidimensional" (Fullan, 1982, p.30), and consist of complex "dynamic interrelationship[s]" (p. 33). The polarization of panelists on some items highlights these complexities. Simplistic approaches to the contribution of vocational education to educational reform only avoids the realities and prolongs the isolation of vocational education from the total educational community. Isolated activities, programs and directions are not going to move vocational education into the future of the reformed educational system.

The panelists in this study also concurred with change theory in emphasizing the need for the involvement of a variety of agencies and individuals in the processes that are taking place. Change, educational change, educational reform, total quality improvement, and futures literature all stress the importance of vision and involvement; while this notion of involvement and collaboration is not new, the nature of that involvement and collaboration is no more clearly defined today than in the early days of educational reform.

Change literature also indicates the necessity of strong and visionary leadership; this leadership appears to be lacking in vocational education today. As a result, the elements of strategic planning and management which coalesce around this leadership are largely absent. The critical components identified by this panel indicate that the lack of a "coherent philosophy" observed by Miller (1985, p. 1) still exists today. The comments of panelists, and the conflict between items which attained consensus and closely related items which did not achieve consensus illustrate the variety of beliefs which underlie the positions held by policy influencers; a cohesive foundation which ties programs, activities and directions together appears to still be a need.

This panel supported many issues raised by the educational reform literature. Critical components as perceived by this panel included items on articulation, integration of vocational and academic education, preparation for productive work life, and development of workplace knowledge; all of these topics are consistent with the calls of reform reports dating to the 1980s and the current charge of education to prepare students for participation in a high performing workplace (Holt, 1993; Schmoker & Wilson, 1993; Wirth, 1993). The critical components identified in this study clearly fall in line with the fourth wave of education reform observed by Futrell (1989), which combined the economic and student-oriented, intrinsic aspects of the earlier waves of educational reform; in other words, "an education that prepares tomorrow's adults to meet ethical as well as economic imperatives - that prepares them not only for a life of work, but also for a life of worth" (Futrell, 1989, p. 13-14). Clearly, while the task identified in this fourth wave is to redefine goals for education and to restructure a system in which those goals may be achieved (Darling-Hammond, 1990; Futrell, 1989; Price, 1990; Timor & Kirp, 1989; Tye, 1992), vocational education does not as yet have a clear set of goals within the context of the current environment.

The findings of this study also indicate that knowledge generated by much of the current research is not supportive of the issues faced by vocational educators today. The harshness of some comments from panelists display frustration with research support systems which should be helping to direct practice. Again, this frustration and the lack of communication is not a novel finding; however, the continuing trend repeated in this study gives further support to the perception that the producers of research knowledge in the field are and continue to be distanced from the practice of the field.

Issues

These findings and implications for knowledge raise a number of issues with implications for practice. Foundational to many issues is the conflict between isolation and involvement. The isolation of vocational education is frequently self-imposed and rooted in traditions; involvement is a popular expression and was discussed by panelists in a number of items, but rhetoric does not create active involvement by vocational education in and with the broader educational system and educational reform. The consequences of continued isolation could be monumental; the separation of vocational education from the changes taking place in the educational system could spell the demise of the field of vocational education as it has been known. Non-involvement could lead to non-inclusion, or even intentional abandonment of what is called vocational education, particularly at the secondary level.

Another issue is the role of vocational education in the reformed educational system. Current practice is deeply divided on the subject of appropriate goals for vocational education, and the findings of this study exhibit that continuing division. What type of vocational education for whom at what level of their education provided where and by whom are all components of the role issue. Is the tight grip on occupational specific secondary programs a remnant of an archaic vision of vocational education? Or, are there reasons based in current vision for these programs? Does a vision for vocational education currently exist? It seems that history overwhelms vocational education, and impedes much of the field from entertaining the potential of the environment of today. Answering these questions will require inward and outward reflection, and undoubtedly will cause agitation and upheaval within the field.

Tied to the role issue is the issue of the vision and philosophy of vocational education. The lack of a commonly held, working philosophy fuels the division on the role of vocational education in a reformed educational system. Without a base of what is real, true and of value in vocational education, how can a role and direction be defined? Can we even consider a role valid if it has an unclear foundation?

The results of this Delphi also raise a communication issue; widely used terms and phrases have a wide range of definitions. Even those influential in the development of policy for vocational education had a variety of definitions for terms, and meanings were often confused. If these knowledgeable individuals have this much difficulty, how much more problematic is the terminology for those outside of or tangentially involved in vocational education? This lack of clarity and common definition might be construed as a measure of flexibility, or a sign of uncertainty. Either case holds the potential for definition to be made and imposed by external sources, removing the ability to self-determine direction from the field. Before vocational education can contribute effectively in the larger community, the field must clarify these meanings for itself.

The issue of appropriate teacher education relates directly to practice; questions raised by the panel include the variability of current teacher education programs, the necessity of a baccalaureate degree, and the continuing learning of teachers. Although the Holmes group initiative was mentioned, it did not figure prominently in comments; what ramifications does that fact have for vocational teacher education? Is this a continuation of the trends of isolation and limited involvement? Or is this a manifestation of the thought voiced in the comment "If it were possible to develop the agreement regarding what the teacher needed to know - then develop the "assessment instruments to judge them - then why would one care where the individual gained those competencies?" Who should decide "what the teacher needed to know" and how to judge them? Perhaps the responsibility for teacher education should be taken from the hands of teacher educators, and placed more directly in the hands of successful practicing educational professionals. The practice of teacher education has been slow to acknowledge the changes taking place in the school environment, and without attention to these questions, could serve only to ill-prepare teachers and impede the contributions vocational education could make to the total educational system and educational reform.

Also in the realm of the college and university is the issue of the role of research. Based on the findings, much of the research being conducted in vocational education is not supportive of vocational education practice; should support of practice be the role of research? If so, what does that mean for the current status of vocational education research? Is the university the appropriate entity to be called on for applied research, or should this practice-centered work be the province of state agencies? The issues emanating from this study make clear demands for investigation; however, many of the issues will be resolved with or without the backing of relevant research. Can research be conducted in a manner so as to aid in the timely resolution of issues, or do things just change too fast for solid research studies to be completed? These issues also provide links to other areas of research, including cognitive science, sociology, psychology, and public policy; how is vocational education taking advantage of advances in these areas within its own research? What are the ramifications if vocational education research does not incorporate the work of other fields into its own work?

A final issue revolves around the issue of a coordinated, cohesive national employment and training policy. A number of panelists called for this, alluding to potential changes and recombinations at the federal level. The practice of education, including vocational education and training, remains largely a state and local prerogative. National level mandates for cooperation between education and employment programs have had a temporal effect similar to that of shaking oil and water; would a national policy be able to function as an emulsifier to create such a coordinated and functioning national employment and training system? Embedded in these issues are sub-issues including that of turf, power and control; is vocational education too caught up in these issues to focus on the total system issue and the total system goal? An interesting sub-issue is also found in the contradictory positions of panelists in this study; although a national level employment and training policy was the subject of much comment and included the idea of Labor, Commerce and Education combined efforts, panelists could not reach consensus on the revision of governance systems. Can governance be separated from a national policy spanning programs and activities of at least three separate federal agencies? Will the national policy be effective if it is?

These issues underscore the complexities surrounding the future of vocational education and contribution of vocational education to the reform of the total educational system. Practice is not detached from issues; on the contrary, it is often bound by them. Dealing with these issues may be as complex as the issues themselves. Vocational education professionals must take the lead or be led.

The many questions raised by this panel, though not all new, merit revisiting and reconsideration; they provide a starting point for practice-related study. The questions of when occupational specialization should begin, where should skills be taught, how should vocational teacher education be reformed, what functions can best be carried out by each level of government, what is the purpose of the secondary/postsecondary distinction, what are proactive program evaluation measures, what does employer and union involvement mean today ("work site learning for credit? curriculum development and approval? assessment of skills and knowledge?"), and if "in context" is "different than experience based" were raised by panelists during this study. These valid questions need to be reassessed and contemplated in the changing environment of vocational education today.

IN CONCLUSION

The end result of this study is a beginning clarification of positions on the directions vocational education should take in the future, as seen by individuals in position to influence that direction. Implications for knowledge and practice are critical. The need for further study is great. Additional work should be undertaken to:

1. refine the list of critical components;
2. address questions raised by the panelists in this study;
3. determine if the items critical to policy influencers are seen as critical by other stakeholders in vocational education, (e.g., local, state and federal administrators, teacher educators, teachers, and legislators);
4. document the development of a vision, focus, and philosophy for vocational education;

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5. explore the definitions of items included in this study, especially those items which were unclear or had multiple meanings;
6. establish a longitudinal study of the implementation and impact of the activities, programs and directions incorporated into future vocational education within the reformed educational system; and
7. investigate the items on which panelists appeared to be polarizing (i.e., those items which were becoming issues).

In addition to the items previously discussed, these seven are of critical importance for both the immediate and longer term future of vocational education given the environment of educational reform.

No one study will provide the definitive answer; rather as one panelist noted, the issues are complex and must be addressed simultaneously. Future directions for vocational education, as seen by individuals able to influence that direction, hold implications for the field, and raise issues for practice. Among these issues were the conflict between isolation and involvement in the total educational community, the role of vocational education, common philosophy and vision for vocational education, internal and external communication, "appropriate" teacher education, the role of university research, and national employment and training policy.

Much of the insight garnered here provides just a glimpse at what those who have demonstrated impact on vocational education related policy see as the contributions of vocational education; this glimpse shows some accord as well as a certain amount of confusion and vagueness about certain programs, activities and directions. As one of the panelists noted, vagueness does not make good policy; neither will ambiguities lend themselves to effective change.

Change will occur with or without the support and guidance of relevant research, and the choice is to become wholly involved or be passed by. A move toward a consensus on the future directions for vocational education, given the environment of educational reform, enhances the current literature base, and empowers vocational education as a field to guide itself into the future.

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Evaluation of Knowledge Structures by Procedures of Networking - in the Context of Commercial Education

SUSANNE WEBER
Diplom-Handelslehrerin
Seminar für Wirtschaftspädagogik
der Georg-August-Universität
Platz der Göttinger Sieben 5
D-37073 Göttingen
GERMANY
Tel. (X-551) 39-4405
Fax (X-551) 39-4417

1. Abstract

Structural changes - marked by key-words as introduction of new information and communication technologies, shortening of working-time, developing internationalization of economy, demographical changes etc. - influence extremely vocational education. This innovation leads by changed job-structures, supplemental computer-skills and newly defined responsibilities on the job to changes of qualification which are not only valid for the worksite but also for private life. Taking into account these changes it becomes more important to teach complex reasoning in the sense of economic contextual knowledge to handle adequately these new complex situations.

The development of diagnostic-instruments has to be parallelized with these changes because it makes no longer sense to evaluate prior-knowledge - e.g., for planning a course - and posterior-knowledge - e.g., for their evaluation - by using tests which ask only for facts. On the contrary instruments have to be used that allow to represent the structure of knowledge as well as the structural changes of knowledge over time.

This paper refers to the development and the use of a new diagnostic instrument as well as to the way of analysis and the interpretation with regard to the cognitive structure - especially the prior-knowledge in the form of economic contextual knowledge and its change.

1. Problems and Objectives of the Project in Question

The importance of prior knowledge for information processing is pointed out in different fields of research (cf. BERTI et al., 1986b; AJELLO et al., 1987; MARTON & SÄLJÖ, 1984, p. 36;

ENTWISTLE & MARTON, 1984, p. 214; PRENZEL & SCHIEFELE, 1986, pp. 120f; MANDL, FRIEDRICH & HRON, 1986, p. 147 and p. 152). Authors in the field of conceptualization theory claim that new subject-matter has to correspond to the prior knowledge structure of the students (cf. CLAAR, 1989, p.48).

Investigators in the field of problem-solving psychology stress the importance of prior knowledge in connection with problem representation. But nearly all these studies are based on expert-novice-differences and do not consider the domain-specific background of students (cf. CHI, GLASER & REES, 1982; VOSS et al., 1983, 1986).

In addition to these psychological findings, didactic theory also outlines the importance of prior knowledge for planning, realizing, and evaluating instructional processes (among others MEYER, 1980; KLAFKI, 1980). On the other hand investigators and teachers always base control of learning on the achieved school level of the students (cf. AJELLO et al., 1987 as well as the critical remarks with ACHTENHAGEN 1984, p. 117). With regard to subject-matter they investigate only isolated economic content units or the traditional subjects of writing, reading, and mathematics (AJELLO et al., 1987; BERTI et al., 1986a und 1986b; cf. CLAAR 1989, p. 251; cf. INGENKAMP / SCHREIBER, 1986, p. 40). Most studies evaluate the knowledge state only at the end of an instruction unit; they ignore the prior knowledge as well as the specific treatment (cf. CLAAR, 1989, p. 59).

2. Development of the Networking Procedure as an Instrument of Measuring Cognitive Structure

It is the intention of our study to find out, whether the students' prior knowledge can be adequately described. We looked for different proposals and decided to use an adapted form of procedures of networking. We mainly followed proposals made by SCHEELE & GROEBEN (1988) and DANSEREAU et al.(1979).

Our instruments have to fulfil at least four requirements:

> *Firstly*, the student has to be enabled to present his own personal prior-knowledge within a net by the help of the concepts and relations being available.

Secondly, it must be possible to compare the concepts and relations to an objective theory of business administration.

Thirdly, it has to be possible to represent complex contextual structures by using these instruments.

Fourthly, changes and differences of the cognitive structure - figured out by the nets - must be modeled: with regard to changes over time and with regard to individual students of school classes.

By the following, the technique used is briefly introduced:

(1) To be sure that our concepts and expressions were familiar to the students we collected by a form of brainstorming in comparable classrooms descriptions of concepts which correspond to a firm and its activities as well as to its environment and relations of how an effective enterprise would work.

Out of a set of 3232 respectively 1240 different concepts and 1237 respectively 430 different relations we condensed the concepts and relations with regard to qualitative and quantitative aspects to 65 concepts and 15 relations. Examples of concepts are: *01. depreciation, 09. working time, 11. education & further education, 18. loan, 32. profit, 30. law, 49. production etc.* Examples of relations are: *R3 leads to, R4 is necessary for, R9 receives, R12 controls etc.* (See the results of the whole pre-studie WEBER, 1992.)

(2) Within our investigation the students got a pile of 65 concept cards and a list with the 15 relations together with a large sheet of paper and glue. The task of the networking was: "Perform a relationship that represents an effectively working firm." The students got 2 hours time for constructing their individual nets. Figure 1 and 2 show the result of a networking procedure done by a student.

FIGURE 1: The Networking of a Student of the experimental Class at t1

FIGURE 2: The Networking of a Student of the experimental Class at t4

Some connections of examples: *This student assumes in his first net that the "demand" determines the "offer quantity", the "worker" has the aim of "production" and that the "trade-union" is responsible for the "working time".*

(3) The full design of our study was the following:

FIGURE 3: Design

(4) The study was embedded into a larger research project which had some more goals:

(aa) *Firstly*, to find out the specific subject-matter underlying the concepts of the networking in the view of an individual student; therefore we added to the networking our so-called "zooming-in-technique" following computer techniques. The "zooming-in-technique" is a method by which the student is requested to specify a selection of basic economic concepts e.g profit, earnings, expenditures, index numbers, returns etc.

(bb) *Secondly*, to compare new complex teaching-learning arrangements and environments to "normal" respectively traditional instruction. Our experimental classroom (with a group of 19 students) therefore was taught by means of a computer-based simulation game called Jeansfactory (cf. PREISS, 1988; cf. ACHTENHAGEN, JOHN, LÜDECKE, PREISS, SEEMANN, SEMBILL & TRAMM, 1988; cf. ACHTENHAGEN, TRAMM, PREISS, SEEMANN-WEYMAR, JOHN & SCHUNCK, 1992), the class under control (with a group of 21 students) was taught the same subject-matter but in the traditional way. With regard to our research interest we selected a pre-post-design with groups under research and control, while recording the process of teaching by observation. We run the investigation in the first year of a German commercial full-time school. The students were in their 11th grade and had an age of about 17 years. They were distributed to the classrooms by chance. We carried out the networking at two different times - at the beginning and at the end of the study (after about 20 lessons, 45 minutes each). The "zooming-in-technique", however, was applied at four different times of data collection.

(5) In this paper we would like to focus only on the problems of describing cognitive structure - respectively: economic contextual knowledge - and its change within the analysis of the networking procedure including the processes of operationalization and their transformation into numerical figures.

3. Analysis of the Networking Procedure under four Dimensions

The evaluation of the economic contextual knowledge is done concerning the following four dimensions:

FIGURE 4: Four Dimensions of Analysis

The dimensions of analyses are **extent**, **structure**, **content** and **stability** of the nets. We operationalized these dimensions by using methods of graph theory - especially using the software-package GRADAP, developed by Dutch colleagues (the editors are STOKMAN & SPRENGER, version 2.1, 1990) - and the theory of business administration (cf. WÖHE, 1991).

We demonstrate the process of operationalization for one individual student out of the experimental class who shows very typical results.

The main goal is to show by which procedures it is possible to evaluate the nets of the students, especially by which procedures numerical figures are won and how these figures can be interpreted with regard to the cognitive structure of the individual students, here: their prior knowledge in the form of economic contextual knowledge and its change.

FIGURE 5: Operationalization of the Concept of "Economic Contextual Knowledge"

3.1 *Operationalization of the Dimension "Extent"*

The extent of a net is defined by its size and measured by the number of propositions respectively pairs of concepts. A proposition is defined as the smallest semantic unit. One example: *"(A) supplier is responsible for the transport"*. We have two concepts: *"supplier"* and *"transport"*, and one relation *"is responsible for"*.

The pattern of interpretation is that a net which consists of many propositions or paired concepts can be jugded as "positive". *This student constructed at t1 a net of 33 paired concepts whereas he chose 52 paired concepts at t4.* (This means that the second net shows a positive change of 57,6 %) (see figure 1 and 2).

3.2 *Operationalization of the Dimension "Structure"*

We operationalized the structure of a net by four indicators and analogous to them four numerical items:

- * The indicator "degree of ruggedness" is transformed into the figure: amount of subgraphs (components).
- * The indicator "degree of complexity" is transformed into the figure: density.
- * The indicator "centrality" is transformed into measures of distance e.g. diameter, median and mean of distances over all pairs of concepts.
- * The indicator "main-and side-effects" is transformed into the status index of HOEDE.

All these indicators are won by approaches of WHITE (1985) and BONATO (1990). The measures are defined by methods of graph theory.

What does "ruggedness" mean?

By this indicator we describe the number of subnets and their isolation respectively their integration with regard to the total net. ***Our student formed at t1 a net out of two subnets and at t4 a net out of three subnets.*** That means: the economic contextual knowledge at t4 is more rugged than at t1 (see figure 1).

What does "degree of complexity" mean?

The degree of complexity is transformed into the figure of density which is defined as the ratio of the actual number of relations to the possible number of relations within the net. The higher the index of density, the more complex is the net structure. *At t1 the net has a density of 0,008 and at t4 a density of 0,013.* That means: the economic contextual knowledge at t4 is more complex than at t1.

What does "centrality" means?

Centrality refers to the path length respectively to the distances within a net. There can be computed a lot of distance-based graph centrality measures, for example the diameter according to the axioms of graph theory. The higher the diameter on the average, the larger the range of a single point respectively economic issue in the net. *The figures are 6 at t1 and 4 at t4.* Comparable measures of centrality (e.g., median and mean of the distances over all pairs of concepts) lead to similar figures. That means: Our student connected at t4 economic issues over shorter distances.

What do "main- and side-effects" mean?

By this measure, one tries to judge the effect of one concept on another concept in the direct neighbourhood (main-effects) as well as the effect on all other concepts of the whole net (indirect neighbourhoods or side-effects). The higher the HOEDE-index the more main and side-effects are considered. *The HOEDE index for t1 is 0,340, for t4 0,467,* that means: the economic contextual knowledge of this student changed positively.

3.3 *Operationalization of the Dimension "content"*

As our project stood under the curricular goals to teach adequate concepts of business administration it was necessary to control the concepts of prior knowledge before and the changed concepts after instruction by a theoretical system of business administration. We used for this comparison the widely circulated book of WÖHE "Einführung in die allgemeine Betriebswirtschaftslehre" ["Introduction to General Business Administration"]. This book is a standard text for German speaking countries published in the 17th edition, at present.

FIGURE 6: Factor-orientated Firm-Model in accordance with WÖHE 1991

Following WÖHE (1991) the organization of a firm is divided into six functional areas: "structure of the firm", "operating accounting", "distribution (marketing)", "production" etc. Concepts as "working conditions", "trade-union", "salaries", "planning" etc. are to be discussed within the area of "structure of the firm", "customers", "advertising", "export" etc. in the area of "distribution (marketing)" etc. So we defined as measures for the content dimension the number of operational areas found in the nets of the students. That means: the higher the number of different areas the more complex the economic contextual knowledge. *Our student used 5 areas at t1 and 6 at t4.*

But this global measure must be elaborated. Using the information given by nets it can be controlled whether each concept corresponds to meaningful concepts and sub-concepts of the theory of business administration.

It is impossible to demonstrate in detail all changes within the nets within this frame.

The student under discussion demonstrates at t4 a higher and more adequate connection of the content units with regard to the theoretical goal structure and theoretical approaches of business administration as he did at t1.

3.4 *Operationalization of the Dimension "stability"*

There exist special overlap indices to compare the consistency of the second net with regard to the first. These overlap indices measure the similarity of the concept-concept connections of two different nets. We choose the index of the geometric mean (cf. Bock, 1974, pp. 48-66) as an adequate index of our problem because this overlap-index considers the different size of the two nets. *In our example the student has an absolute overlap of 1 as to the concept pairs.* That means that only one paired concept was mentioned as well in the first net as in the second net. *The geometric mean amounts to 0,024.* On the level of propositions we didn't find any similarities in the nets of this student. This figures show that our student heavily modified the structure of the first net. One interpretation is that he learned - we hope by the instruction in the experimental class - which concepts of his prior knowledge were wrong or misleading.

4. Conclusion and Evaluation of the Method of Networking

Summarizing the results for our student we come to the following conclusions:

It can be said that the structural prior-knowledge of the student No. 3 under experiment has changed to the positive 'right direction'. It has become more extensive, higher connected and more detailed, and shows more main and side effects.

By that we got the impression that our method of networking together with the chosen steps of operationalization can be effectively used to describe and to evaluate the cognitive structure of students, here with regard to their economic contextual knowledge and its change (cf. WEBER, 1994).

It is important for developing "economic reasoning" - which is indispensable for being successful at a complex job - that the students succeed in recognizing the connection between concrete operational processes and the abstract concepts of the operating accounting (cf. WEBER, 1993), the manifold connections between the firm and its environment as well as main- and side-effects. This is exactly the point, where the greatest problems of further economic education turn up, right now.

We are trying to make use of these results, statements, and interpretations as well as those gained by the "zooming-in-technique" - which cannot be presented here for the lack of space - to develop efficient principles of construction for complex teach-ing-learning-arrangements.

As to the education of the teachers and their further education, there will be information on which level a unit is to start and how to teach the terminology and the concepts together with their connection.

These are problems, however, that go far beyond the analysis introduced in this paper.

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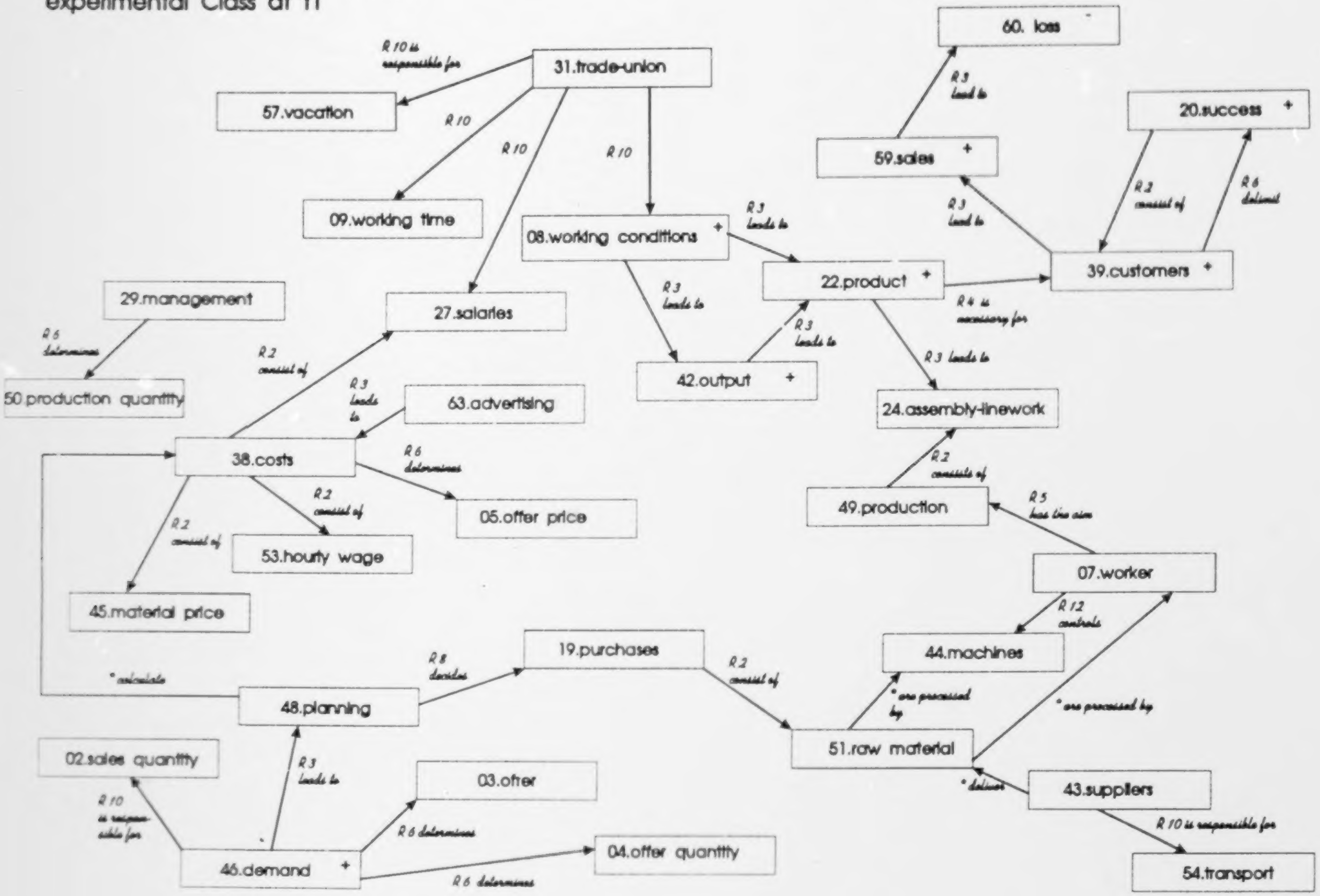
Networking of a Student of the experimental Class at t1


31.trade-union
R 10 is responsible for
57.vacation
R 10
09.working time
R 10
R 10
08.working conditions +
R 3 leads to
22.product +
R 3 leads to
42.output +
R 3 leads to
R 4 is necessary for
39.customers +
R 3 lead to
59.sales +
R 3 lead to
60. loss -
20.success +
R 2 consist of
R 6 delimit
R 3 leads to
24.assembly-linework
R 2 consists of
49.production
R 5 has the aim
07.worker
R 12 controls
44.machines
* are processed by
* are processed by
51.raw material
* deliver
43.suppliers
R 10 is responsible for
54.transport
19.purchases
R 2 consist of
R 8 decides
48.planning
* calculate
29.management
R 6 determines
50.production quantity
27.salaries
R 2 consist of
63.advertising
R 3 leads to
38.costs
R 6 determines
05.offer price
R 2 consist of
53.hourly wage
R 2 consist of
45.material price
02.sales quantity
R 10 is responsible for
R 3 leads to
46.demand +
R 6 determines
03.offer
R 6 determines
04.offer quantity

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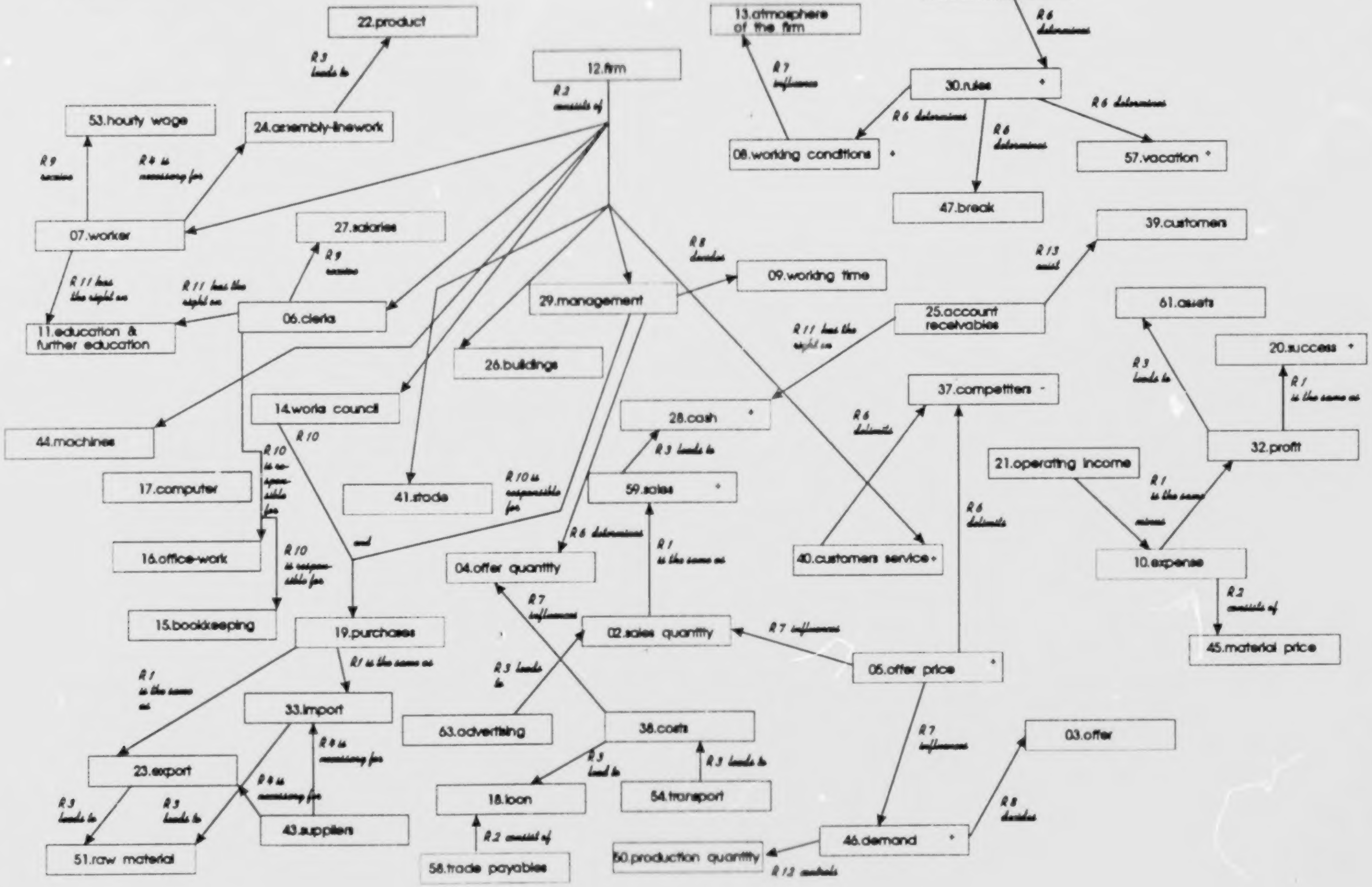
Networking of a Student of the experimental Class at t4


22.product
12.firm
13.atmosphere of the firm
31.trade union
R 3 leads to
R 2 consists of
R 6 determines
53.hourly wage
24.assembly-linework
30.rules +
R 7 influences
R 6 determines
R 6 determines
R 9 receive
R 4 is necessary for
08.working conditions +
R 6 determines
57.vacation +
47.break
07.worker
27.salaries
39.customers
R 8 decides
09.working time
R 13 exist
R 11 has the right on
R 11 has the right on
R 9 receive
29.management
25.account receivables
61.assets
11.education & further education
06.clerks
R 11 has the right on
20.success +
26.buildings
37.competitors -
R 3 leads to
14.works council
28.cash +
R 6 delimits
R 1 is the same as
44.machines
R 10
R 3 leads to
32.profit
R 10 is responsible for
17.computer
41.stock
R 10 is responsible for
59.sales +
21.operating income
R 6 delimits
R 1 is the same
and
R 6 determines
R 1 is the same as
minus
16.office-work
04.offer quantity
40.customers service +
10.expense
R 10 is responsible for
R 7 influences
R 2 consists of
15.bookkeeping
19.purchases
02.sales quantity
R 7 influences
45.material price
R 1 is the same as
05.offer price +
R 1 is the same as
R 3 leads to
33.import
63.advertising
38.costs
R 7 influences
03.offer
R 4 is necessary for
23.export
R 4 is necessary for
R 3 lead to
R 3 leads to
R 3 leads to
R 3 leads to
18.loan
54.transport
R 8 decides
43.suppliers
R 2 consist of
46.demand +
51.raw material
58.trade payables
60.production quantity
R 12 controls

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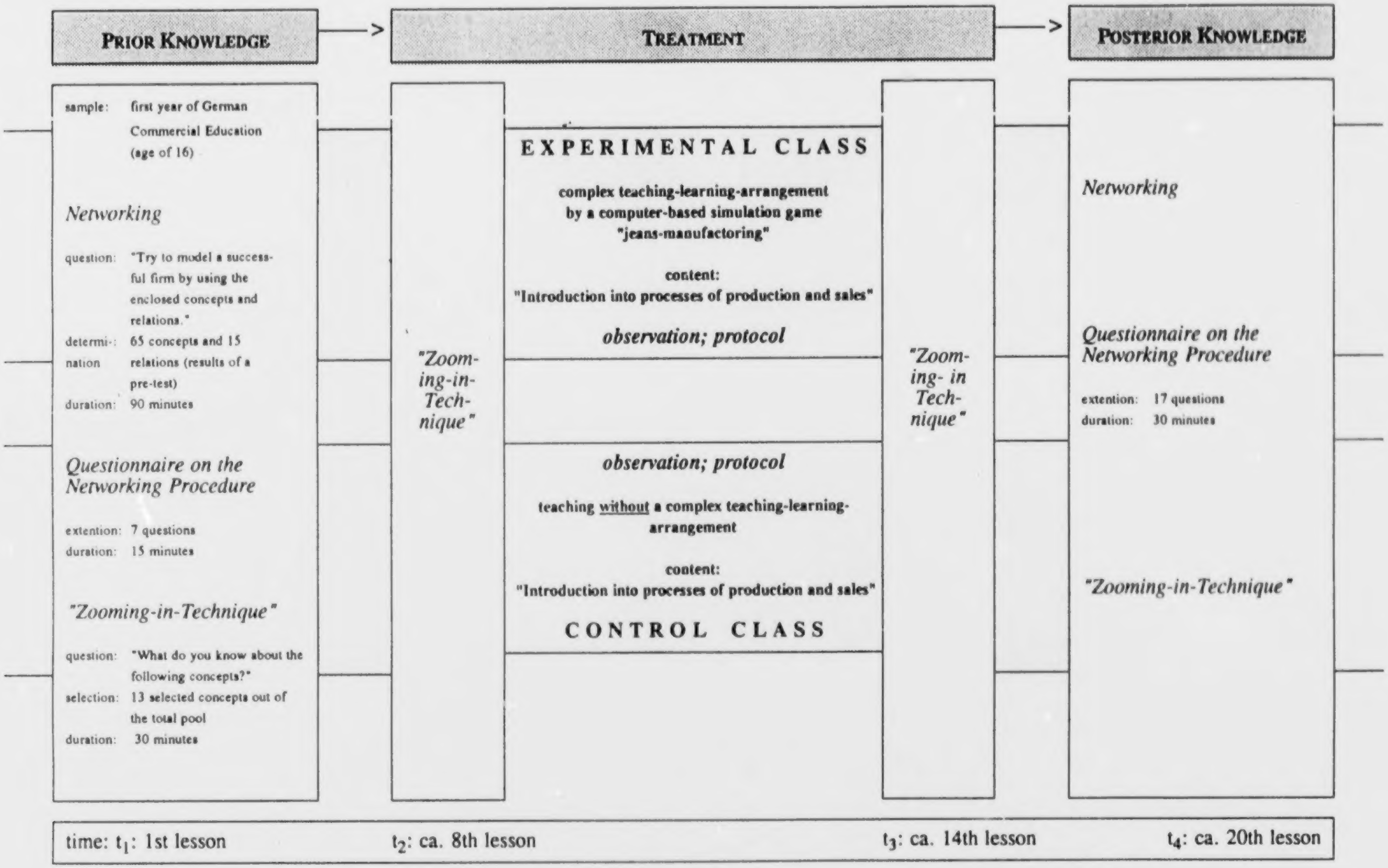
Design:



PRIOR KNOWLEDGE —> **TREATMENT** —> **POSTERIOR KNOWLEDGE**

PRIOR KNOWLEDGE

sample: first year of German Commercial Education (age of 16)

Networking

question: "Try to model a successful firm by using the enclosed concepts and relations."
determination: 65 concepts and 15 relations (results of a pre-test)
duration: 90 minutes

Questionnaire on the Networking Procedure

extention: 7 questions
duration: 15 minutes

"Zooming-in-Technique"

question: "What do you know about the following concepts?"
selection: 13 selected concepts out of the total pool
duration: 30 minutes

TREATMENT

"Zooming-in-Technique"

EXPERIMENTAL CLASS

complex teaching-learning-arrangement by a computer-based simulation game "jeans-manufactoring"

content:
"Introduction into processes of production and sales"

observation; protocol

observation; protocol

teaching without a complex teaching-learning-arrangement

content:
"Introduction into processes of production and sales"

CONTROL CLASS

"Zooming- in Technique"

POSTERIOR KNOWLEDGE

Networking

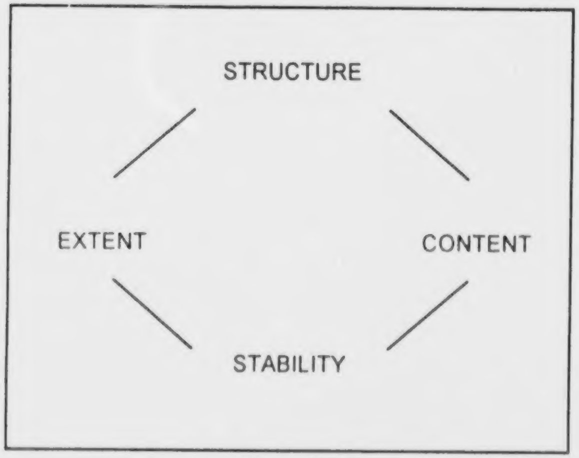
Questionnaire on the Networking Procedure

extention: 17 questions
duration: 30 minutes

"Zooming-in-Technique"

time: t_1: 1st lesson | t_2: ca. 8th lesson | t_3: ca. 14th lesson | t_4: ca. 20th lesson

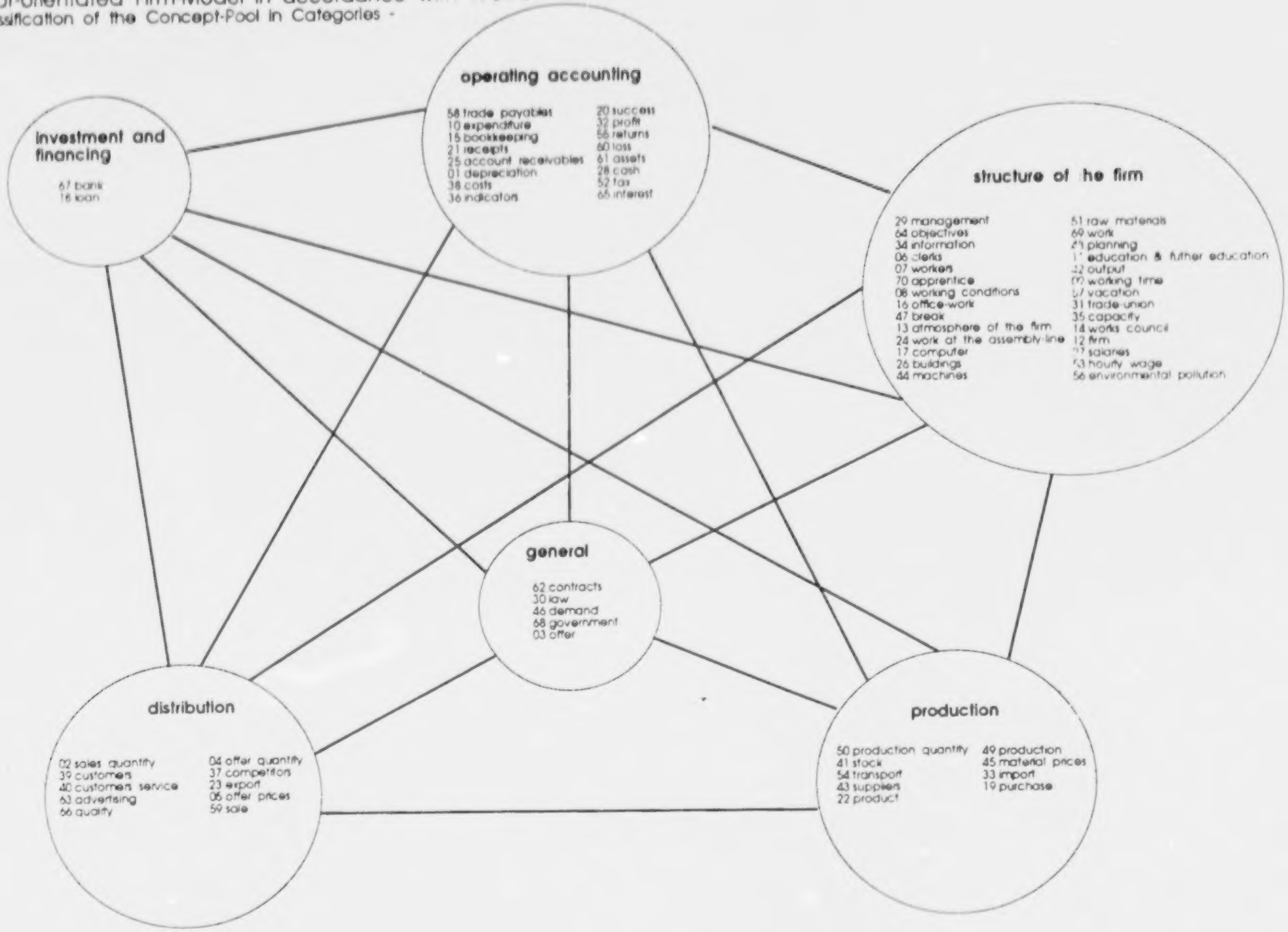
Four Dimensions of Analysis


STRUCTURE
EXTENT
CONTENT
STABILITY

Operationalization of the Concept of **"economic contextual Knowledge"**
with regard to the four Dimensions of Analysis

DIMENSIONS	INDICATORS	NUMERICAL ITEMS
EXTENT	size	amount of propositions respectively paired concepts
STRUCTURE	degree of ruggedness	amount of subnets respectively components
	degree of complexity	density = amount of propositions / amount of possible propositions
	centrality	path length (measure of distance) a) diameter $(d_{max}(u,v))$ b) median and c) mean of the distances over all pairs of concepts
	main- and side-effects	HOEDE status-index
CONTENT	system of business administration	a) amount of operational areas mentioned in the net b) connections between the operational areas defined by WÖHE
STABILITY	consistence	index of overlap: geometric mean

Factor-orientated Firm-Model in accordance with WÖHE
- Classification of the Concept-Pool in Categories -


operating accounting
58 trade payables
10 expenditure
15 bookkeeping
21 receipts
25 account receivables
01 depreciation
38 costs
36 indicators
20 success
32 profit
55 returns
60 loss
61 assets
28 cash
52 tax
65 interest
investment and financing
67 bank
18 loan
structure of the firm
29 management
64 objectives
34 information
06 clerks
07 workers
70 apprentice
08 working conditions
16 office-work
47 break
13 atmosphere of the firm
24 work at the assembly-line
17 computer
26 buildings
44 machines
51 raw materials
69 work
planning
education & futher education
output
working time
vacation
31 trade-union
35 capacity
14 works council
12 firm
salaries
hourly wage
56 environmental pollution
general
62 contracts
30 law
46 demand
68 government
03 offer
distribution
02 sales quantity
39 customers
40 customers service
63 advertising
66 quality
04 offer quantity
37 competitors
23 export
05 offer prices
59 sale
production
50 production quantity
41 stock
54 transport
43 suppliers
22 product
49 production
45 material prices
33 import
19 purchase

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The Impact of a Career Development Program on Middle School Students

Carolyn R. Benz
Department of Educational Administration
University of Dayton
Dayton Ohio 45469-0534

Ron Kindell
Montgomery County Joint Vocational School District
6800 Hoke Road
Clayton Ohio 45315

Paper presented at the annual meeting
American Educational Research Association
New Orleans, Louisiana
April 4-8, 1994

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Carolyn R. Benz
University of Dayton
Ron Kindell
Miami Valley Career Technology Center

OBJECTIVES

The Individual Career Planning program is designed to develop the understandings among middle and high school students about the world of work and their potential roles in that world. The program was created as a result of a state of Ohio law requiring career planning for all students. Among eighth graders the objective is to bring about an awareness of the various paths toward employment and the decisions one must make to plan for that process. The purpose of this study was to determine whether or not there were significant changes from pretest to postest scores on the Career Maturity Inventory among eighth graders in 29 school districts served by the Montgomery County Joint Vocation School District during the 1992-93 school year. Secondly, successes as well as the questions that were raised while carrying out this study are discussed. Lessons learned here (or questions raised here) may be informative to other school-university research collaborative arrangements.

PERSPECTIVES AND THEORETICAL FRAMEWORK

At early adolescence, students have very little idea about their future occupational path. Other than chance informal discussions with those in their immediate environment, there has typically been no press to make career-related choices at this point in their lives. Therefore, many enter secondary schools ill-equipped to select courses that may support eventual choices they must make.

Uninformed course selection through the secondary years predetermines a perhaps undesirable career path for many students and, in other cases may preclude students from training for job roles for which they are well-suited.

President Clinton recently urged every state to develop school-to-work programs (Olson, 1993). More than 250 million dollars is in the proposed federal budget for such initiatives. A potential crisis has emerged as policymakers have recognized that about 70% of American students enter the labor force without education or training beyond high school (AACTE, 1992). As if this were not sufficient basis for concern, there is an additional group who begins college but does not complete a baccalaureate degree. One stipulation of future federally funded programs is that they include career exploration.

Much research has been done that might inform how educators plan career exploration programs for adolescents. The structure and functions of program design may partly be informed by apprenticeship programs in European countries (Bailey, 1993a 1993b; Hamilton, 1993) as well as what is known about adolescent needs and development (Clausen, 1991; Entwisle, 1990; Mortimer et al., 1990; Vandracek, Lerner, and Schulenberg, 1986). Other studies have examined a variety of demographic characteristics of students who may be the most important beneficiaries of career development programs (Farmer, 1985; Barrington and Hendricks, 1989; Danziger, 1983; Marini and Greenberger 1978; Rumberger, 1983; Wijting, Arnold, and Conrad, 1977). The study reported here can add to this knowledge base, not only in terms of showing program impact on student attitudes but also on methodological issues of school-university research collaborations.

METHODS AND DATA SOURCE

A pretest-postest design structured this quantitative study. Two years of program data have been collected and analyzed. Between 2500 and 4500 eighth grade students (each year) across 29 school districts in southwestern and south central Ohio were participants in an Individual Career Program. This paper focuses on the second year.

Prior to the onset of the program (in the fall of the year) students were administered what was called a Career Maturity Survey, made up of 20 items designed to elicit responses that would show both attitudes and behaviors. This instrument measured a low level of career maturity, in essence, a beginning stage of thinking about the dynamics of careers and planning for careers. On this instrument some items stated ways to approach decisions that related to future education and training; other queried their ideas about career fields and feelings of their personal potential. The instrument was in a multiple choice format. For each item one response was operationally defined as the "immature response" while all others were acceptable "mature responses." The "immature response" typically was one that described an unawareness of the item ("I don't know") or a lack of thought about the item. One group of items inquired about potential areas of study that were on the minds of these students. There were demographic items on the instrument as well.

At the conclusion of the program the same instrument was administered to all participants. Data analysis was driven by a hypothesized decrease in immature responses from pretest to postest. The study was limited in that the program, while uniformly designed, was not uniformly implemented across districts. School level results, then, become the most useful on which to draw conclusions.

The instrument was selected as appropriate by the joint vocational district because it was consistent with the goals of the eighth grade program, the stage at which students were assumed to move from virtually no knowledge about careers or planning for careers to an initial awareness of these issues.

Students were given scantron sheets on which to respond to the survey at both pretest and postest; and directed to use the last four digits of their telephone number as an identification code. Pretests and postests were matched by this ID and a resulting dataset was created for each school district.

Statistical analyses were generated for each school's dataset. The McNemar test, a special case of chi square, was calculated for each career attitude item. This special case of chi square is appropriate for dependent frequency data, the situation when the data consist of frequencies, or counts, in "before and after" designs. The data here consisted of either mature or immature responses on pretests and postests. Interpreting the calculated chi square allows the results to indicate whether or not there is a significant difference between pretest and postest responses. Further analysis was done to examine whether or not males and females differed in their career maturity. Results on the attitudinal items at both the pretest and the postest were analyzed for gender differences.

The internal validity of the study was threatened by the distribution of pretest results to schools. This knowledge, rather than the ICP program, is a likely explanation for significant increases at the postest.

The Individual Career Planning Program (ICP)

Eighth grade may seem too early to be thinking about a career, but students make important decisions while planning for high school and the designers of this program assume that these decisions need to be made with an informed perspective. This stage of career education fits within a global plan for education in careers across each student's 12 years of formal schooling (see Figure 1: Career Education in Ohio). The goal of the program is not a finalized career plan, but an initial awareness of careers, the importance of planning, and learning that their decisions have consequences.

The program usually lasts nine weeks, although the time might vary somewhat district to district. During this program students are oriented to careers, occupations available, worker characteristics in different occupations, and the relevance of school subjects to different occupations. Students take inventories of their aptitudes, interests, and abilities; they are taken through exercises in self-awareness, self-assessment and future trends. They begin to develop an academic plan for high school that is consistent with their interests.

RESULTS AND CONCLUSIONS

Data have been collected on participants from two academic years (1991-92; 1992-93). Of those in the first cohort (N=2900) 17 of the 21 school districts showed overall decreases ($p<.05$) in the number of immature responses at the postest from an analysis at the school level. No matching of pre and post was possible on these data so only school level results could be obtained. In nine of the districts the declines were statistically significant when using as N, the number of items on which change was in the hypothesized direction. For the second cohort (N=approximately 4000 students in 29 schools; 1992-93 school year) school level results were analyzed; those results are reported next.

Table 1 summarizes the statistically significant findings. In those cells with an "x" are the items where significant ($p<.05$) gains were made. The rows represent school districts and the columns, the first 13 items (all but the demographic items) on the inventory.

Twenty-nine schools made up this study. Three schools' results were not tested for significant change because the data were either not in analyzable form or a previous instrument was used. Of the 26 remaining schools, eight showed no statistically significant change on any item, pretest to postest. Eighteen schools showed such change. Two items showed a strong pattern of significant change across most schools. These were items #3 and #9. Inspection of the matrix shows the strong pattern of growth on these items, compared to the other items.

Item #3 states "When I finish high school, I will probably..." and four optional responses describe either work, further schooling, or a combination of the two; with a fifth response of "I haven't thought about it." This last response is the immature choice. All others are considered mature responses.

Item #9 states "I think the best way I can prepare for my future career is to.." and four responses describe high school courses, science, languages, etc. A fifth response states, "I haven't thought about it.." This was the immature response. The strong pattern of significant growth on this items suggests that, overall, students have begun to consider optional paths for the coming years.

The table that follows, Table 2, adds 14 cells to the original matrix. The cells that are inside boxes indicate those items on which the schools showed significant decline in maturity. In other words, these results showed statistically significant change, but that change was in the opposite direction; students went from mature responses on the pretest to immature response on the postest. One district accounts for seven of these negative findings. Because of the questionable state of part of the dataset from that district, these results are suspect. A safer interpretation is that in about 7 instances, the students declined from mature response to immature responses.

Table 3 presents the results on gender differences. All items were not tested for gender difference. Because items #3 and #9 showed the strongest pattern of meaningful pre-post growth from immaturity to maturity across all districts, on only these two items were gender differences tested. We felt that the results on these two items would provide sufficient indication of the impact of gender. We concluded that overall no strong pattern of gender difference is apparent, at either the pretest or the postest. Only in very few instances were the chi squares significant. (Where there was a significant gender difference, the statistic is underlined on Table 3). Interestingly, in two districts, both items showed significant gender difference at the pretest and then no gender difference at the postest.

DISCUSSION

Concern for students who will end their formal education at the secondary level is growing in this increasingly technological world. Fewer and fewer job opportunities exist that require only a high school diploma. While the concern is becoming more visible at the federal level, states have begun to initiate career awareness programs from the very early grades. Ohio now mandates career programming for all students. The results here show differences that relate to the two strongest themes of The Individual Career Planning program: consideration of life after high school (item #3) and the fact that high school coursework is linked to ultimate occcupational choices (item #9).

This research, as an evaluation case study from a large Ohio program, may contribute to the knowledge base in two ways: (1) show student outcomes from one program as well as (2) suggest methodological considerations for others contemplating such an initiative.

What was discovered in carrying out this study that might suggest ideas for future such collaborations? School-university collaborative arrangements are increasing in number, and each member in the partnership comes from a distinct culture, different in many ways from the culture of the other. (In this study there was no tight link between individual schools and the university because the school was actually a regional consortium of 29 schools.) What did we learn about the often choppy and muddy waters of these two cultures that the school people and the university people must jointly navigate? Three suggestions come to mind, the inequality of the two partners, the untaught skill of data management, and communication.

The two partners were not equal, their interests were not in balance. It was clear that effective career awareness among students was the goal of the program. The university researcher was not an equal partner, the vocational schools' goal had stronger weight. Compromises were made over the course of the study in order to best meet the goals of the program, one result of which was weakening the research design. Informing schools of the pretest results was justified so that teachers might use these data to improve their work. While limiting the design validity it was reasonable given the program goal. Whether or not and to what extent the pretest results were used by teachers is unclear. Our discussions raised the larger question of: to what extent can university-school research collaborative arrangements work when important values of each culture are not shared?

Data management is rarely taught in educational research classes; probably assumed to be the results of on-the-job training. The dissemination and retrieval of data collection forms and accurate record-keeping is crucial in studies such as this one. Creating those systems only comes after the two partners establish solid communication and shared understandings. Anticipating the unforseen should be built into every research study. The partners need to join their ideas about process; talk to one another about the ways that successful things happen in each of their settings. What's necessary to get the data analyzed may not be clear to the school partner. What's necessary to get standardized data collection procedures across multiple schools may not be clear to the university partner. We discussed the question: to what extent are the researcher's requirements consistent with the school setting? Can internally valid studies ever take place in schools?

Good communication between the two partners was the foundation without which the study might have suffered. Many discussions were necessary to allow each to understand the perspective of the other. Many conversations took place before the work began. Openness, trust and attempts to understand the presuppositions of each other grounded the work. Talking to one another was good; talking to one another's colleagues and program participants is even better. The extent to which the researcher knows the program participants and understands their goals is irrelevant to the data analysis. It is totally relevant to the teachers' willingness to participate in eventually understanding the research results, however. Talking to one another is essential. The researcher met and talked with participant teachers as this study came to a conclusion; it would have been better to have talked with them at the outset, to understand their perspectives, their goals, and the meaning of the outcomes to them. This raises the larger perennial questions of the research-practice dichotomy: Is research relevant to the classroom; is the classroom relevant to research; and who defines the research questions?

Almost everything went right for us in this study. The collaborative arrangement was highly successful. Time spent by each researcher in the other's setting, flexibility in making changes was maintained. Only minor things went wrong; and the solid understanding between the two partners minimized their effects. As wrong forms were used in one school, as one dataset got misplaced, as timelines got repeatedly changed, as operational definitions got unoperationalized, we still would answer "yes" to the question of whether or not research is relevant to the classroom. The classroom is relevant to research. A. E. Berthoff (1987) has presented the right balance, we believe, between research and the school. He makes clear that the research questions must come from the schools, and, surprisingly, even suggests that the procedures need to be formed by those working in the schools as well. We're not totally convinced of the latter, but offer his ideas to conclude our paper:

"Educational research is nothing to our purpose, unless we formulate the questions; if the procedures by which answers are sought are not continually REformulated (sic) by those who are working in the [school], educational research is pointless."

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Figure 1a. Ohio's Career Development Blueprint-middle school

based on: National Occupational Information Coordinating Committee

1. Structured means for students to gain knowledge of, understand, and express one's self.

2. Formal and informal methods that enable students to measure and interpret achievement, aptitude, interest, and personality.

3. Current and specific data concerning the world of work.

4. Experiential opportunities to explore career options related to individual choice.

5. The process by which one uses all information to relate educational choices to future career goals.

6. An expansion of individual career choices, based on personal interests and abilities and not limited by sex, race, ethnicity, age, or handicap.

7. Information related to social, economic, and technological changes and the individual's need to adapt to those changes.

8. Those work behaviors and abilities, and attitudes necessary to obtain, maintain, and advance in employment.

9. The process of developing plans specific to a determined outcome.

10. School-based activities that encourage responsibility to and citizenship within the community.

11. Information relating income, work, and economic concepts to individual career choice and money management.

12. Opportunities that assure vocational career options receive equal emphasis in an individual's educational planning.

Figure 1b. Twelve key topics for K-12

Ohio's Career Development Themes

1. SELF AWARENESS/SELF CONCEPT
2. SELF ASSESSMENT
3. CAREER INFORMATION
4. EXPLORATION
5. ACADEMIC PLANNING
6. REDUCTION OF BIASES
7. FUTURE TRENDS
8. EMPLOYABILITY SKILLS AND ATTITUDES
9. GOAL SETTING AND DECISION-MAKING
10. COMMUNITY INVOLVEMENT
11. ECONOMICS AND PERSONAL FINANCE
12. VOCATIONAL ORIENTATION

Table 1

Career Maturity Items showing statistically significant shift from Immaturity at pretest to Maturity at postest

	1	2	3	4	5	6	7	8	9	10	11	12	13
School 1			X							X			
School 2													
School 3													
School 4													
School 5	X						X						X
School 6									X				
School 7			X										X
School 8					X							X	X
School 9													
School 10	X												
School 11													
School 29*													
School 12			X				X		X				
School 13			X						X				
School 14													
School 15													
School 16			X						X				
School 17		X	X					X					
School 18													
School 19	X								X				
School 20			X										
School 21			X						X				
School 22		X	X						X				
School 23	X		X										
School 24			X				X		X				
School 27**													
School 28**													
School 25			X										
School 26			X			X			X				

*data not yet available

**data not coded by ID

Table 2

Career Maturity Items (in boxes) on which statistically significant results were found in opposite direction (from maturity on pretest to immaturity at postest)

	1	2	3	4	5	6	7	8	9	10	11	12	13
School 1			X							X			
School 2													
School 3													
School 4													
School 5	X						X						X
School 6									X				
School 7			X										X
School 8	$\boxed{X}$			$\boxed{X}$	X	$\boxed{X}$		$\boxed{X}$	$\boxed{X}$	$\boxed{X}$	$\boxed{X}$	X	X
School 9													
School 10	X			$\boxed{X}$								$\boxed{X}$	
School 11													
School 29*													
School 12			X				X		X				
School 13			X				X		X				
School 14													
School 15										$\boxed{X}$			
School 16			X		$\boxed{X}$				X				
School 17		X	X					X					
School 18													
School 19	X								X				
School 20			X										
School 21	$\boxed{X}$		X						X				
School 22	$\boxed{X}$	X	X						X				
School 23	X		X										
School 24			X				X		X				
School 27**													
School 28**													
School 25			X										
School 26			X			X			X			$\boxed{X}$	

*data not yet available
**data not coded by ID

Table 3 GENDER DIFFERENCES ON ITEMS #3 AND #9:
Pretest and Postest, for all School Districts

	ITEM #3		ITEM #9	
	When I finish high school..		***Best way to prepare..***	
	Pre Chi Sq. (N)	Post Chi Sq. (N)	Pre Chi Sq. (N)	Post Chi Sq. (N)
School 1	.06 (46) nonsig	.20 (46) nonsig	1.07 (46) nonsig	.097 (46) nonsig
School 2	.62 (96) nonsig	2.18 (96) nonsig.	2.29 (96) nonsig	.21 (96) nonsig
School 3	2.85 (60) nonsig	4.35 (60) sig	.63 (60) nonsig	.74 (60) nonsig
School 4	0.03 (119) nonsig	.75 (119) nonsig	.003 (119) nonsig	.31 (119) nonsig
School 5	9.57 (135) sig	.04 (135) nonsig	.15 (135) nonsig	3.36 (135) nonsig
School 6	3.60 (39) nonsig	2.12 (39) nonsig	.08 (39) nonsig	3.17 (39) nonsig
School 7	2.26 (121) nonsig	.00 (121) nonsig	.00 (121) nonsig	.11 (121) nonsig
School 8	.12 (192) nonsig	.18 (192) nonsig	3.67 (192) nonsig	.42 (192) nonsig
School 9	.421 (53) nonsig	1.03 (53) nonsig	.73 (53) nonsig	1.04 (53) nonsig
School 10	1.22 (530) nonsig	1.49 (530) nonsig	2.55 (530) nonsig	.91 (530) nonsig
School 11	.70 (69) nonsig	.31 (69) nonsig	.38 (69) nonsig	8.00 (69) sig
School 12	.01 (282) nonsig	1.66 (282) nonsig	2.51 (282) nonsig	1.47 (282) nonsig
School 13	1.61 (116) nonsig	2.72 (116) nonsig	1.67 (116) nonsig	1.51 (116) nonsig
School 14	.004 (61) nonsig	.72 (61) nonsig	8.67 (61) sig	2.04 (61) nonsig

table continued

GENDER DIFFERENCES ON ITEMS #3 AND #9:
Pretest and Postest, for all School Districts

	ITEM #3 ***When I finish high school..***		ITEM #9 ***Best way to prepare..***	
	Pre Chi Sq. (N)	Post Chi Sq. (N)	Pre Chi Sq. (N)	Post Chi Sq. (N)
School 15	4.87 (85) sig	.04 (85) nonsig	3.17 (85) nonsig	1.76 (85) nonsig
School 16	7.65 (427) sig	.47 (427) nonsig	.18 (427) nonsig	.06 (427) nonsig
School 17	1.87 (168) nonsig	.68 (168) nonsig	.08 (168) nonsig	.68 (168) nonsig
School 18	.09 (124) nonsig	.20 (124) nonsig	.92 (124) nonsig	.87 (124) nonsig
School 19	.12 (191) nonsig	3.05 (191) nonsig	.75 (191) nonsig	2.10 (191) nonsig
School 20	1.68 (78) nonsig	.81 (78) nonsig	5.99 (78) sig	2.09 (78) nonsig
School 21	4.09 (64) sig	4.03 (64) sig	2.03 (64) nonsig	.76 (64) nonsig
School 22	1.53 (308) nonsig	1.92 (308) nonsig	1.28 (308) nonsig	1.72 (3.08) nonsig
School 23	.03 (69) nonsig	1.67 (69) nonsig	1.14 (69) nonsig	.68 (69) nonsig
School 24	11.58 (130) sig	4.79 (130) sig	.00 (130) nonsig	.12 (130) nonsig
School 25	3.02 (98) nonsig	2.25 (98) nonsig	6.79 (98) sig	.00 (98) nonsig
School 26	.48 (221) nonsig	.22 (281) nonsig	.25 (211) nonsig	.16 (281) nonsig

A Framework for the Subject Matter of Vocational Education: New Vision for Relating Education to Work and Family Life Responsibilities

by George H. Copa

George H. Copa is Professor in the Department of Vocational and Technical Education at the University of Minnesota. The research reported here was supported by the National Center for Research in Vocational Education, University of California, Berkeley. The ideas and opinions expressed here are solely those of the author. This paper was prepared for presentation at the American Educational Research Association, April 7-8, 1994, in New Orleans, Louisiana.

ABSTRACT

This paper addresses the question, "What should be the subject matter of vocational education?" A new vision for vocational education is proposed as a means to guide it into the 21st century. A central assumption is that the aim of vocational education is education which is directed toward enhancing vocational development characteristics of an educated person. Work and family life roles and responsibilities form essential aspects of vocational life and therefore are taken as the focus of vocational education. The proposed framework for the subject matter of vocational education describes the uniqueness, content, method, and structure for vocational education. Questions and activities which would lead to further refining the framework are posed as next steps.

A Framework for the Subject Matter of Vocational Education: New Vision for Relating Education to Work and Family Life Responsibilities

by George H. Copa

Vocation education as a professional field is in need of a more intellectually convincing framework for its subject matter. Since vocational education's inception as a curricular category in the nation's public schools at the beginning of the twentieth century, it has drawn its basic direction and meaning from federal legislation. While the continuous support and encouragement of federal legislation is applauded as an indication of strong and committed public interest, the legislative arena does not provide the sustained and disciplined context for organizing the subject matter of a maturing professional field. The goal here is to propose a practical theory to guide decision making with respect to the curriculum or subject matter of vocational education with the vision of more authentically relating education to work and family life responsibilities.

"What should be the subject matter of vocational education?" is a practical question. As used here, practical refers to questions requiring attention to aims, content, alternatives, and consequences for their resolution and to questions where resolution requires judgment and action with real effects on the stakeholders in the enterprise under consideration, in this case vocational education. A practical theory of the subject matter of vocational education should identify and organize assumptions and propositions to guide vocational education through the array of problems it faces over time. The theory should assist professional vocational educators to understand the array of problems at hand and anticipated, be able to draw helpful insights from relevant disciplines, operate under the guidance of ethical ideals, and take actions that are intellectually coherent and morally justified.

The vision for the subject matter of vocational education is presented in five sections. Section one describes a family of central concepts related to the idea and ideal of vocational education. The analysis and interpretation of each central concept is summarized as a set of assumptions underlying the meaning of vocational education. Section two presents the implications of an extensive review of curricular research in vocational education conducted as part of this effort. The review is critical to understanding the history and development of vocational education's subject matter and serving as a base from which to entertain feasible improvements. The third section describes the results of a series of meetings with a study group composed of professors at the University of Minnesota drawn from a variety of disciplines and focused on discussing the future direction and content of vocational education. Section four presents the proposed conceptual framework for the subject matter of vocational education. The last section suggests questions to guide dialogue among the stakeholders in vocational education and education more generally about the proposed subject matter framework and activities which would add substance to the framework so as to see its consequences with greater clarity.

Central Concepts

In order to proceed efficiently with a discussion of the subject matter of vocational education, it seemed wise to first map out the meaning of important concepts which are likely to come up frequently in the conversation. The meaning of these concepts and their implications for the subject matter of vocational education frame the theoretical or conceptual base for the proposed subject matter for vocational education. The central concepts which were the focus of analysis included: (a) educated person; (b) education; (c) vocation(al); and (d) vocational development. Each of these concepts was explored both historically and from the background of several disciplines including economics, psychology, philosophy, sociology, and anthropology. The result of the conceptual analysis (Copa, 1992) was a set of assumptions or propositions regarding each concept as shown in Table 1.

Drawing on this base of assumptions, the meaning of vocational education held in this proposal is that vocational education is education which is directed toward enhancing vocational development characteristic of an educated person. Some salient implications about vocational education with this meaning are, for example, that vocational education should be viewed as a family of processes which includes training. Vocational education should be guided by ethical, aesthetic, and technical considerations if it is to be most effective. The ultimate aim of vocational education is a fully educated person, particularly from a vocational development perspective. In the present day, work and family life roles and responsibilities form essential aspects of vocational life and should therefore be the focus of vocational education.

Curricular Research

In addition to the conceptual analysis, a second part of the analysis involved an extensive review of curricular research in vocational education (Copa and Bentley, 1992). The review was conducted to better understand the history and development of the present subject matter, that is, how it came to be as it is, and to insure that recommendations for the future would provide for a feasible transition from what is to what is proposed. The review of literature was organized into major sections dealing with:

(a) historical analysis of curricular research; (b) review of current curricular research; and (c) suggestions for future curricular research in vocational education. Since the sub-fields of vocational education are very prominent when viewing the curriculum of vocational education in school settings, each major sub-field, that is, agriculture, business and office, health, home economics, industrial, and marketing education, were treated separately as well as vocational education as a whole.

The analysis of the historical development in recent research with respect to curriculum in vocational education suggested several research questions that are continuing and/or emerging as significant for future educational research. Some questions persist over time, with responses needing to change with the changing social, economic, and educational context. Other questions are newly emerging as seemingly more important with this changing context. Some examples of the areas of questions that emerged from the review of literature include: (a) vocational education as general vs. specific education; (b) vocational education and higher order thinking skills; (c) vocational education and basic skills; (d) integration within vocational sub-fields; (e) keeping vocational education up-to-date; (f) articulation among levels of vocational education; (g) coordination among providers of vocational education; and (h) attention to the full range of work and family responsibilities. The overall conclusion reached from the review was that the curricular research in the subfields of vocational education and vocational education as a whole is extensive and disciplined, it is in large part (with some notable exceptions) still narrowly focused on technical competence, lacking in an overall conceptual framework, and heavily reliant on a single approach to curriculum development (e.g., instrumental/technical).

Interdisciplinary Perspective

A third major method or procedure used in developing a base for the subject matter of vocational education was to convene a group of professors that represented both vocational fields as well as several of the academic disciplines including economics, sociology, philosophy, history, and American studies (Copa and Tebbenhoff, 1990). This group met over a period of three months to talk about the foundations of vocational education (i.e, the underlying concepts and knowledge base that are important to vocational education) and the interrelationship between vocational education and academic disciplines in the context of thinking about its subject matter and role in American education. Major recommendations of this group included: (1) questioning about subject matter should start from the practical problems found in the vocational aspects of life and "back into" the needed foundational content from academic disciplines rather than vice versa (see Figure 1); (2) questioning should confront the basic moral issue relating to the status of vocational education; and (3) questioning should seek to enhance certain characteristics of vocational education to include mainstreaming it as an integral part of general education, building on its comparative advantage in instructional methods of cooperation, application, and experiential learning, strengthen its role as "change master" in improving the conditions of vocational life, and insuring that vocational education addresses interpretive and emancipative aspects of vocational life as well as the technical aspects.

Proposed Framework

The proposed framework needs to address the focus, uniqueness, content, method, and structure of vocational education. First, with respect to the focus of vocational education, attention is to vocational development characterizing an educated person. Vocational development means a life-long process which concentrates on the development of capacity for vocational responsibilities. Vocational responsibilities mean the expectations for accomplishment in social and economic roles in which individuals take responsibility to provide services or products which are of value to them and others.

Second, the conclusions with respect to the uniqueness of vocational education are that learning which enhances vocational development takes place in a variety of settings including family, school, work, and other community settings. The degree of directness of an educational experience toward vocational responsibilities can vary from general to specific and tangential to central. In some degree all learning leads to vocational development. However, for some educational experiences the directness toward preparation for vocational responsibilities is more central and specific. This is the unique aim of vocational education (see Figure 2).

Third, the content of vocational education is learning which enhances success in vocational responsibilities. The content of vocational education is therefore made of the learning which makes for success in resolving problems or concerns encountered in taking vocational responsibilities. Since vocational responsibilities are made up in most part of work and family responsibilities, the problems or concerns of most interest are those which are continuously or persistently encountered in work or family life. These problems or concerns are made up of the discrepancies between the desired state of affairs in vocational life wherever it is played out (i.e., in home, workplace, family) and the present state of affairs (see Figure 3). In this context, a tentative categorization of the problems or concerns encountered in taking vocational responsibilities (Copa, 1992) is shown in Table 2.

Fourth, the methods of vocational education stress sustained thinking about difficult problems that have real consequences in the context of vocational responsibilities. Learning occurs in, about, and through the content of vocational education. In its aims and practice, the content and methods of vocational education are inseparable. The methods of vocational education involve foundational as well as specialized study (see Figure 4).

Last, with respect to structure, the educational process must be structured so that learning which focuses on work and family life does not unnecessarily stratify individuals economically or socially. A powerful means for preventing stratification is to ensure that vocational education is a part of a common education of all individuals and to give equal status to all levels of vocational responsibilities and roles. The proposed framework for the subject matter of vocational education involves two major transformations in educational policy and practice (see Figure 5). The first is to form an enhanced general or common education which encompasses vocational education as an indispensable component in interaction with other components of the curriculum. The second transformation is to enhance the content of vocational education itself, to explicitly focus on several problem areas in addition to specific skills. These transformations are viewed as complementary and responsive to the changing nature of work and family life.

Implications and Recommendations

The proposed framework recommended to guide the focus, development, and organization of the subject matter of vocational education is presented to encourage further conversation and debate in the field. To assist in this process, a series of questions and suggested activities are raised to stimulate discussion and clarify the proposed framework for the subject matter of vocational education, and thereby the relation of school learning to work and family life responsibilities. For example, what should be the relationship between work and family responsibilities and its supporting content; what problems should be selected to be addressed within each problem area; what should be the relationship of specific skills to more general skills; since the problem of vocational life are often continuing or perennial concerns, what should be the relationship of the subject matter of vocational education available across the life span?

With respect to activities, two particular activities are suggested as needing attention. First, much more work is needed to identify and classify the problems encountered in work and family responsibilities. A second major activity would involve the pilot testing of the proposed framework for subject matter in actual school settings. Here it would be important to consider the basis for selecting feasible sites, conducting the necessary training, guiding implementation, and thorough assessment of consequences. A beginning on the latter activity with very successful results is reported by Beck, Copa, and Pease (1992) in a report entitled An Uncommon Education: Interaction and Innovation.

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Table 1

Major Propositions Underlying the Subject Matter of Vocational Education

Educated person

- An educated person is always on to something that gives meaning and zest to living.
- An educated person has a broad understanding of a phenomenon and its connection to a coherent pattern of life as well as being skilled -- they are able to address why as well as how.
- An educated person has a way of looking at things that involves commitment, consistency, and caring as regards standards and actions which contribute to a good and just life and society.
- An educated person has a desired series of capacities and the propensity and capability to demonstrate them when needed.
- An educated person has practical intelligence as a means to effectively handle the complexity and challenge of everyday life which requires clear attention to aims, context, and consequences of action.
- Educated persons exploit their human potential as evolving capacity, propensity and capability in relation to desired social conditions and values.

Education

- For education to lead to the intellectual activity of understanding, a prerequisite to insight, innovation, and appreciation, what is learned must be personalized; to be personalized, education must use the aesthetic possibilities in present as well as the future experiences.
- For education to lead to a sense of power and control over one's life and responsibility to others, prerequisites to a democratically functioning society, the learner (and teacher) must be critical of what is learned and able to reason what is acceptable on intellectual and moral grounds.

- Education encompasses a family of activities which must meet certain norms including being ethical in process, attentive to individual differences, and stimulating to individual development.

- Education does not lead merely toward specialization, but rather, to a changed way of looking at things, of seeing a coherent and evolving pattern in the diverse decalogue of life experiences.

Vocation(al)

- Vocations are both social and economic roles by which one contributes to and benefits from the shared way of life in a society.

- In the twentieth century context, vocations refer essentially to one's responsibilities in work and family life roles.

- Individuals often have more than one vocation at the same time; the interaction of these vocations can be as significant as their separate effects.

- Selection of vocations and fulfillment of responsibility in vocations should be reasoned by ethical principles.

- Vocations, through the aesthetics of needed responsibilities, should give positive meaning to life.

Vocational development

- Vocational development is a lifelong, ongoing process.

- Vocational development is manifest as a series of stages.

- Vocational development is an integral part of general development.

Source: Copa, G. H. (1992). What should be the subject matter of vocational education? Berkeley, CA: National Center for Research in Vocational Education.

Table 2

Illustrative Problems of Vocational Life

Problem Area	Description	Illustration
1. Understanding work and family (vocational) life.	Anticipating and making sense out of the problems encountered at work and at home.	What should I do about finding my place in organizations which will allow me enough economic security that I can have choices about my work and family life? • How can I come to know my interests, talents, and goals? • What will I have to deny myself in order to earn a living wage; establish my own family? What is my role in work and family organizations? • What is it like at the top? In the middle? At the bottom? • What is it like in new organizations (i.e., birth and growth of opportunities/ babies)? • What is it like in organizations at times of crisis? • What is it like in organizations at time of decline? What is possible for me in my current position? For the future? Whose motives direct my actions and decisions at the workplace and in the home (i.e., mine, others, government, society, children, religion)? How can work help me to shape and know who I am? How is my self identity expressed or denied at my work and in my family? What is fair compensation for my efforts (i.e., money, self-esteem, pride, feeling successful, status)? What is the connection between a "good" education and "good" work? Will I get a good job? Will my children turn out well? Will my community be a better place to live?

Problem Area	Description	Illustration
		How can I employ my abilities and skills in making and doing? How do I make good decisions about my employment and my family (i.e., knowing myself, knowing the nature of work, knowing the nature of family)? What is the meaning of work mobility? How does this affect me and influence my family life (i.e., commuting, transfers, telecommuting, plant closings, globalization, foreign parts)? What is the history of jobs in the workplace and in families which affect me today? What impact does work done and families now have on the future of the world? As an individual can I shape the future or am I helpless?
2. Rights and responsibilities in work and family life.	Distribution of power and authority encountered in work and in family life. Characteristics of responsible workers and family members.	What are the sources of real power to get things done? What should I do about feeling powerless? What are my responsibilities at work and at home? Where are the sources of information on rights and responsibilities and how do I use them (i.e., duties, OSHA, unions, ad hoc groups, human resources departments)? How does work meet my needs for protection for me, for my family, and for my community (i.e., medical, legal, retirement, out placement, environmental)? Who owns my good ideas, inventions, and new insights about work and family? Can I prevent a former employee/employer/ spouse from competing? How do I recognize imbalances in employee/employer rights and responsibilities (i.e., strikes, law suits, layoffs, concessions, family violence, teenage antagonism toward parents, workaholics, pollution, paternalism, work antagonism toward management)?

Problem Area	Description	Illustration
		What can I expect regarding fairness in my places of work and in the family (i.e., compensation, equal opportunity, affirmative action, discrimination, trust)?
		What can I expect regarding safety in my places of work and in the home (i.e., physical, environmental, personal, emotional)?
		In my situation, what are the issues (rights) which are worth fighting for by organized labor, ad hoc groups, government, neighbors, family (i.e., job security, right to strike, divorce, counseling, decent compensation, right to work, health and safety, equity, participatory management/marriage)?
		What responsibilities are expected of me which should be stated explicitly (i.e., duties, learning on the job, work ethics, adding value)?
		What responsibilities are expected of me which are usually implicit (i.e., honesty, loyalty, commitment, health, flexibility)?
		What techniques can I learn which will help me strike a balance between my rights and responsibilities and others (i.e., strikes, grievances, slow downs, conflict management, counseling, support groups, time management)?
3. Relationships in work and family life.	Interrelationships among individuals in work and in family life.	How should I relate to peers; spouse?
		How should I relate to subordinates; children?
		How should I relate to supervisor; parents?
		How can I relate to work groups at the workplace and in families (improved group dynamics)?

Problem Area	Description	Illustration
		What acts and attitudes make work relations harmonious in workplaces and in the home? What is troublesome?
		What is my role when relations are harmonious? Troublesome? When should I fight? When should I take flight?
		What are the problems when people enter roles for the first time?
4. Technology in work and family life.	Dealing with technology and technological change in work and family life.	How should I deal with technological change at work and at home? • How should I deal with technological changes which are desired? Undesired? Expected? Unexpected? • How has our environment been changed by new technology? • How am I affected by technology transfer (i.e., nationally, internationally)?
		How should I evaluate the effects of technological change? • Is new technology having good or bad effects on the stability of my work and family institutions (i.e., home, school, recreation)?
		Can I support an investment of resources in technology for national defense?
		How does technology help me do my work (i.e., in the past, now, in the future)?
		What is the influence of tools and technology on work and family values?
		What should I do about ethical questions arising out of technology? Who should answer these questions? • How best can technology be fitted to human needs? To environmental needs? • How can I select and use resources for technology? Who owns resources? • If I accept technological change, must I accept responsibility for its by-products?

Problem Area	Description	Illustration
5. General work and family life competence.	Concerns which are procedural in nature, but **general** across various work and family responsibilities.	What problems are mine to solve? How creative should I be? How will the ability to "read people" help me use my reading, written, oral, and listening skills? How can I adapt to the work which is expected of me at home and in the workplace (i.e., learning, adjusting)? How accurate do I have to be to avoid extra expenses? How can I develop my leadership potential? How do I handle leadership succession at the top? How can I produce more value than my predecessor? • How can I work smarter not harder? • How can I have more time with my family and co-workers for fun things? How can I do it right the first time? How can I know that what I've done is what was desired? What is quality? Do I know how I fit into this workplace or family? When is it my time to nurture others? To be nurtured?
6. Specific work and family life competence.	Concerns which are procedural in nature, but **specific** to selected work and family responsibilities.	How should I adjust a carburetor (for an automobile mechanic)? How should I balance a budget statement (for an accountant)? How should I discipline a child without destroying self-esteem (for a parent)? How should I produce a newsletter (for an office worker or a volunteer)? How should I give a bed bath (for a health care worker)?

Problem Area	Description	Illustration
		How should I plan and prepare a nutritious meal (for a parent or food worker)?
		How should I share an idea (for a spouse)?
7. Managing work and family life.	Managing one's own work and family life.	What life style should I select? • How can I establish and maintain a strong family without economic stability and security? • What are realistic expectations of the use of my resources in the workplace and in my family?
		How should I use my resources appropriately? • How does work affect my personal and family life (i.e., time, energy, psychological interference)? • How does this work get divided up in my life (i.e., day care, house management, food preparation, transportation, elder parents)? • How do I best manage (optimize) the time and resources I have? • What should be my backup plans (risk management plans) when things don't go right?
		What changes should I consider in my work and family life? • How can I cope with stress (i.e., its causes, reduce it, use it)? • How can I accomplish changes in my work and family lives?

Figure 1
Sources of Foundational Content of Vocational Education

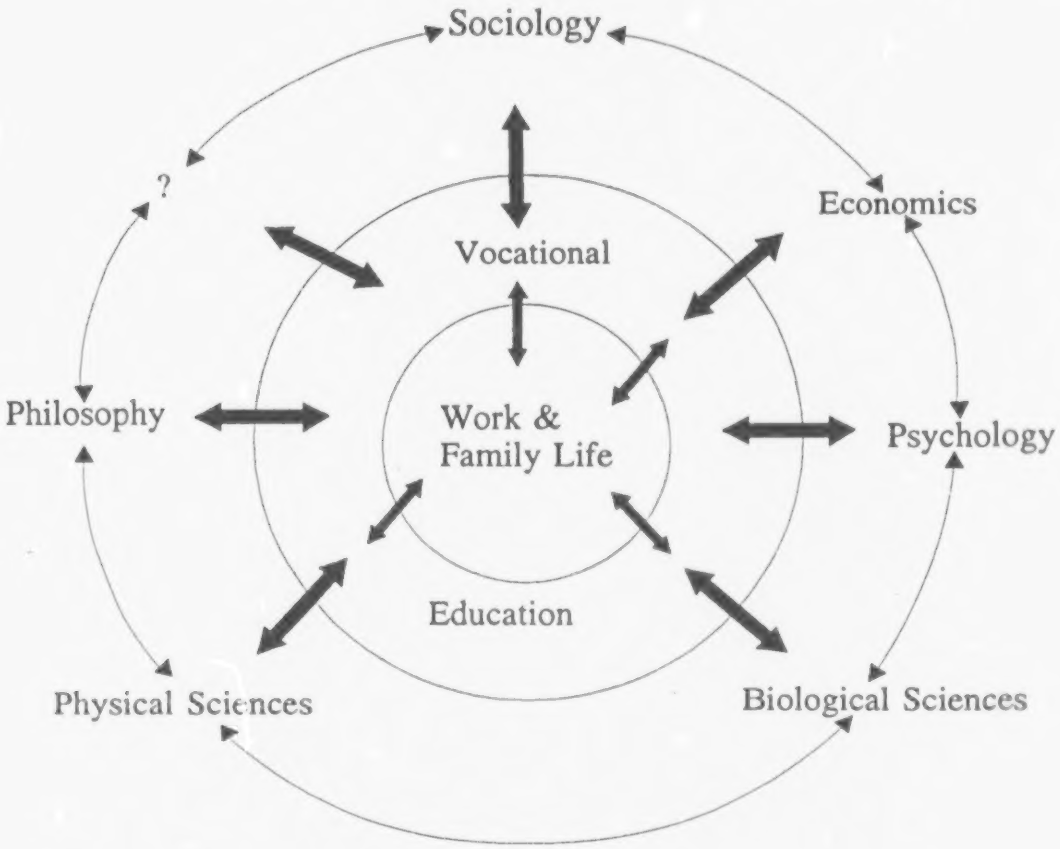

Sociology
?
Economics
Vocational
Philosophy
Work &
Family Life
Psychology
Education
Physical Sciences
Biological Sciences

Figure 2
Unique Role of Vocational Education in Enhancing Human Development

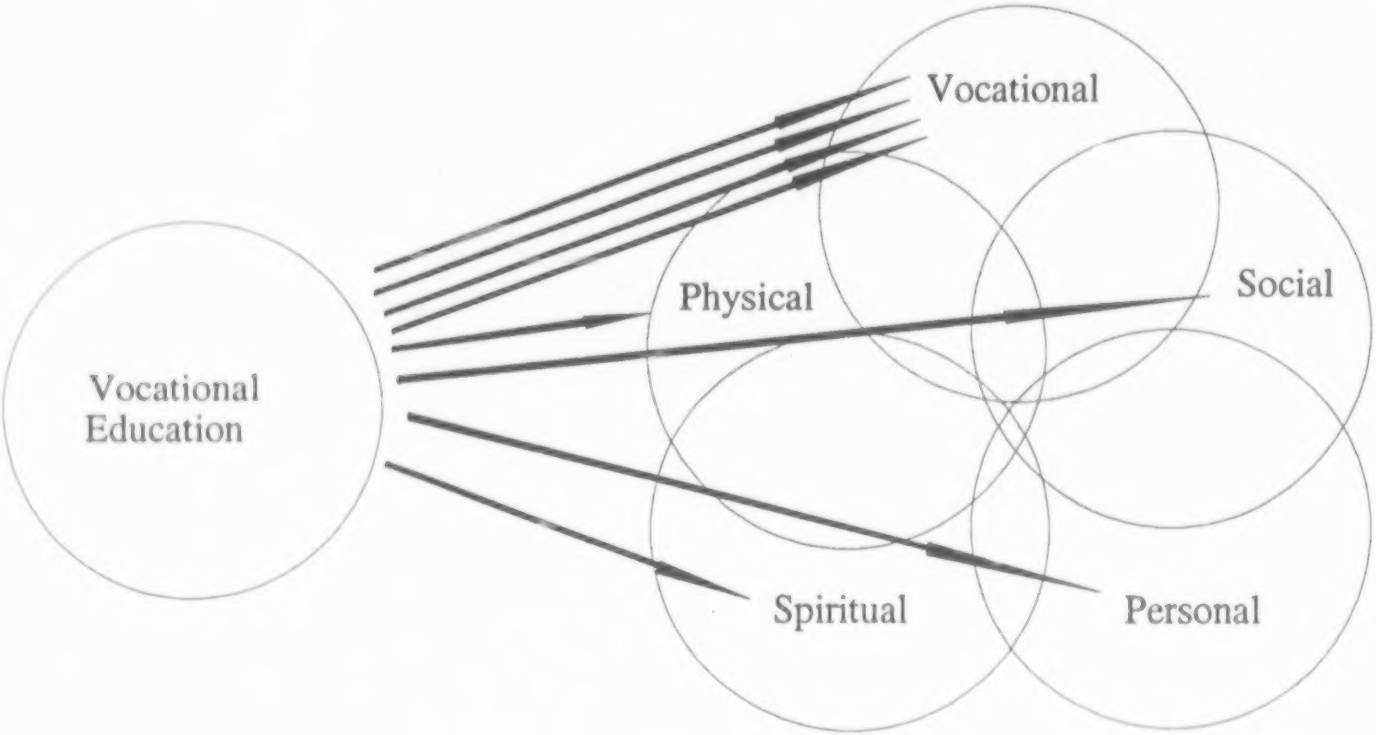
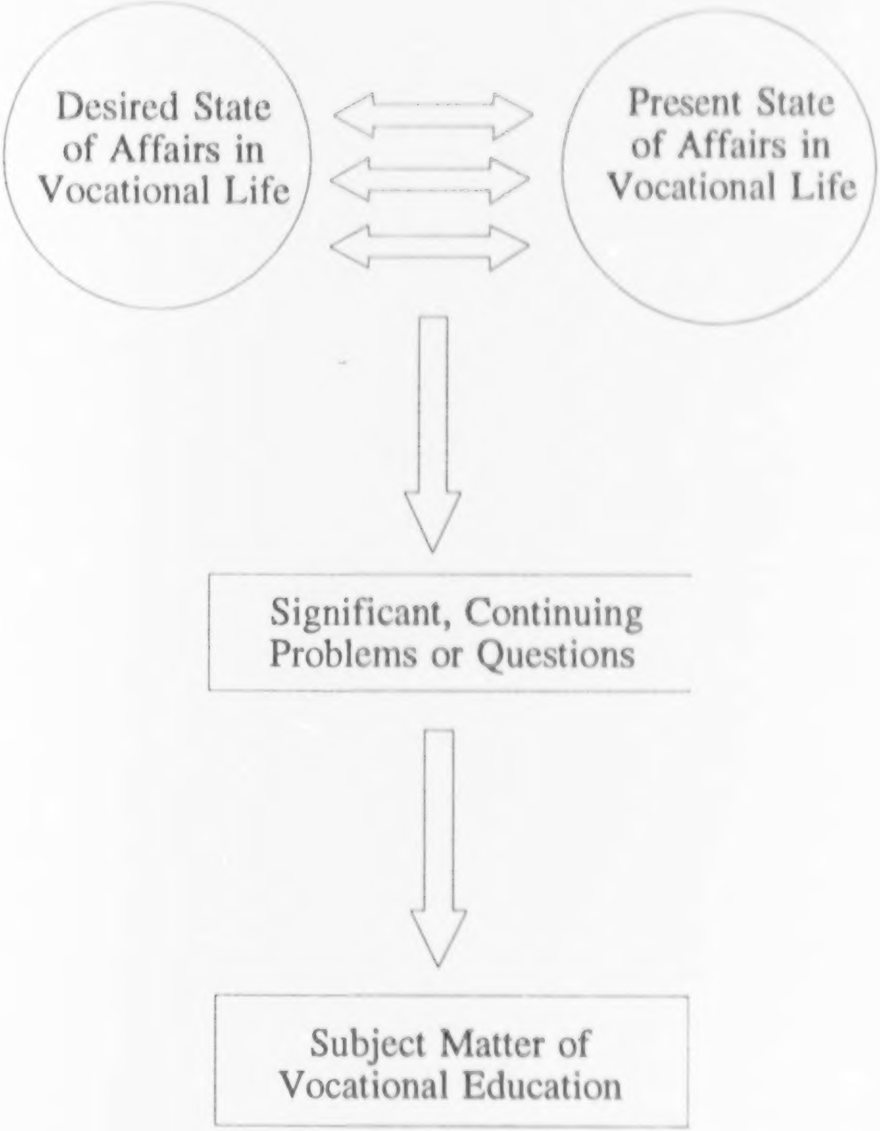
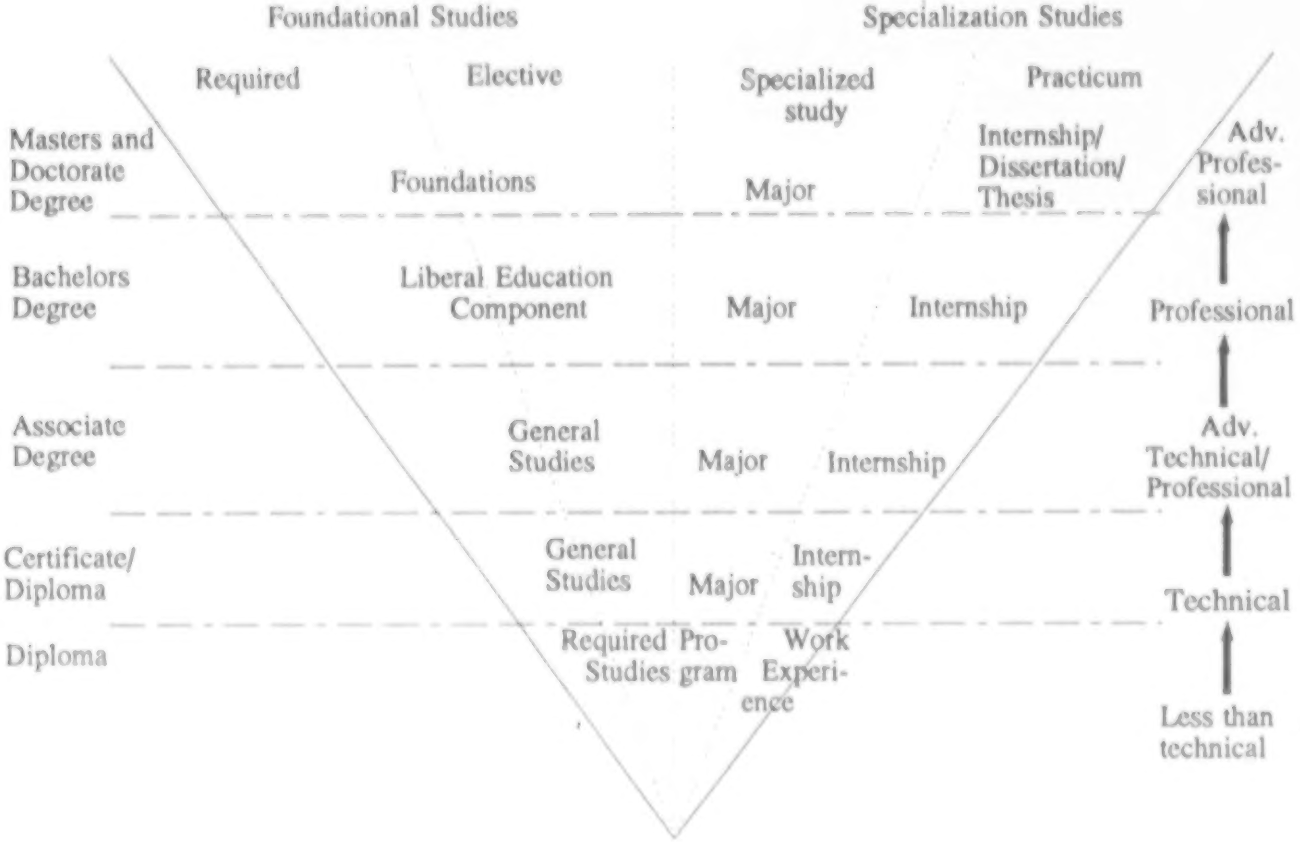

Vocational Education
Vocational
Physical
Social
Spiritual
Personal

Figure 3
Deriving the Problem or Concerns Serving as a Basis For the Subject Matter of Vocational Education


Desired State of Affairs in Vocational Life
Present State of Affairs in Vocational Life
Significant, Continuing Problems or Questions
Subject Matter of Vocational Education

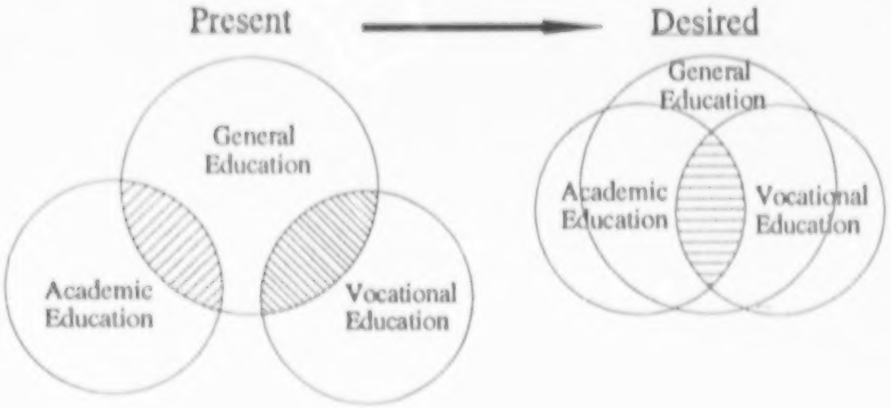


Foundational Studies
Specialization Studies
Required
Elective
Specialized study
Practicum
Masters and Doctorate Degree
Foundations
Major
Internship/ Dissertation/ Thesis
Adv. Profes-sional
Bachelors Degree
Liberal Education Component
Major
Internship
Professional
Associate Degree
General Studies
Major
Internship
Adv. Technical/ Professional
Certificate/ Diploma
General Studies
Major
Intern-ship
Technical
Diploma
Required Studies
Pro-gram
Work Experi-ence
Less than technical

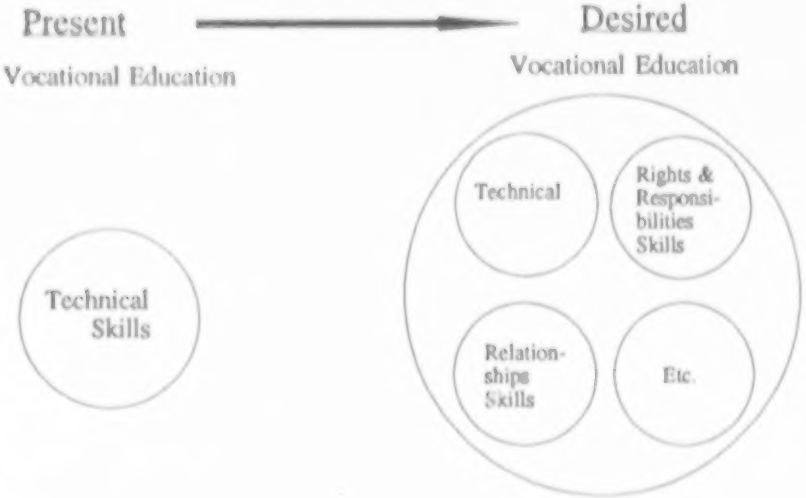
Figure 4
Vocational Education Continuum for School-based Learning

Figure 5
Proposed Transformations in the Subject Matter of Education, More Particularly Vocational Education

1. Enriched view of general education for all students


Present
Desired
General Education
Academic Education
Vocational Education
General Education
Academic Education
Vocational Education

2. Enriched view of subject matter of vocational education


Present
Vocational Education
Technical Skills
Desired
Vocational Education
Technical
Rights & Responsi-bilities Skills
Relation-ships Skills
Etc.

MENTORING: IS IT A FACTOR IN FIRST-YEAR TEACHER ADJUSTMENT

Robert C. Harris

Secondary Education Program
School of Education
Indiana University
Bloomington, Indiana 47405

Paper presented at the
American Educational Research Association Meeting
New Orleans, Louisiana
April 8, 1994

MENTORING: IS IT A FACTOR IN FIRST-YEAR TEACHER ADJUSTMENT

Robert C. Harris

The use of mentors with new teachers has become more widespread since the mid-1970s (Jacobi, 1991). While the concept of mentoring has roots deep in historical precedent (i.e., guilds and Far-Eastern occupational training), the contemporary use of mentors with new teachers is grounded on three purposes: (a) emotional and psychological support (Johnson, 1989), (b) direct assistance with career and professional development (Olian, 1988), and (c) role modeling (Kram, 1985). The early use of mentors in education was founded on an informal approach. This approach recognized a natural selection process between protege and mentor and the relationship had little formal structure. More recent interpretations of the mentor/protege relationship have recognized the element of structure, i.e., naming a specific mentor, and designating specific functions within the mentor's role (Schockett and Haring-Hidore, 1985).

The Indiana State Board of Education adopted a mentoring program as a component of the certification pattern for non-degreed vocational education teachers (ISBE, 1989). These rules specified a mentor will be assigned during the first year of teaching to the Occupational Specialist I Teacher. Subsequent interpretations spelled out mentor qualifications and functions (ISBE, 1990). The Indiana model clearly recognized the formal mentoring approach and set in place a program designed to ease the new teacher into the school and classroom. Other approaches in vocational education are consistent with it (Loyd and Redick, 1991). The mandate for classroom observations and conferences established a formal relationship. A checklist of possible discussion topics established a broad range of discussion material. The exclusion of administrators was designed to encourage open problem centered discussions between the mentor and new teacher.

The Mentor-Occupational Specialist I Survey was conducted in May 1993. The 1992-93 academic year was the third year of implementation for the mentor program. During this year, fifty-two (52) teachers were certified as Occupational Specialist I Teachers. A random sample of thirty-four (34) teachers was drawn

(65%). Thirty (30) survey instruments were returned (88%). Four (4) teachers indicated that a mentor had not been assigned to them during this first year of teaching. This reduced the number of useable forms to twenty-six (26).

Selected background information on the new vocational teachers is provided in Table 1. Additional background information is included in Appendix A. A quick overview of the data suggests the majority of teachers were in the age group 30 - 45; males outnumbered females 2 to 1; slightly more than fifty percent (50%) of the "new" teachers had some formal teaching experience; and almost all of the teachers had at least five months experience in their assignment by the time of the survey. Mentors were predominately vocational education teachers. Of serious concern was the non-appointment of four mentors and the appointment of three administrators as mentors. Each of these factors note non-compliance with the state rules, and they effected twenty-three percent (23%) of the teachers in the survey sample.

See Table 1

Other factors noted in the rules have mixed implementation. For example, seventy-two percent (72%) of the teachers indicated their relationship with the mentor began with the opening of school or their initial work. However, the number of classroom observations and conferences was below expectation. Only twenty-seven percent (27%) of the teachers indicated their classroom had been observed the minimum frequency, and thirty-eight percent (38%) had not been observed at any time during the year. The frequency of conferences was more encouraging with fifty-two percent (52%) of the new teachers indicating ten or more conferences. However, almost a third of the teachers indicated a conference with their mentor had not occurred.

See Table 2

Direct assistance with career and professional growth was considered an important function of the mentor-protege relationship. The **Indiana Handbook** suggested a number of topical discussion areas. The topics reflect the range of problems teachers typically confront and they are designed to draw upon the mentors' experience and insight.

Sixty-three (63) items were included on the topical checklist. The maximum number of items checked by one teacher was fifty-eight (58) and the minimum by one teacher was one (1) (see Appendix B). However, all items received a minimum of three checks and the mean number of topics checked was twenty-six (26). The fourteen (14) most frequently checked items appear in Table 3. More than half (57%) of the new teachers checked these fourteen (14) topics. Among the topics, interest in classroom management concerns was highest.

See Table 3

Fifty percent (50%) of the new teachers indicated they had conferred with their mentor on matters that can clearly be associated with psychological support, e.g., feeling discouraged, excessive work load, etc. Psychological support is difficult to delimit since greater control over one's environment (e.g., knowledge, change in teaching behavior, etc.) can be a positive supporting factor.

Finally, we turn to two questions: "Was the mentor program viewed as helpful?" and if so, "Was the nature of the mentor-protege relationship and/or the number of topics discussed related to the new teachers' perception of helpfulness?"

The criterion for judging the effectiveness for the mentor program was "helpfulness of the mentor program." This variable had five (5) options. A display of the respondents' choices is shown in Table 4. Options 1 and 2 were combined to indicate "very helpful." Option 3 was considered "mixed." Options 3 and 4 were combined to indicate "little help." With these combinations, "very helpful" was fifty percent (50%); "mixed" was twenty-three percent (23%) and "little help" was twenty-seven percent (27%).

See Table 4

The cornerstone of the mentor program is the exchange of information, a two-way dialogue between the mentor and protege. In Table 5, the number of topics discussed has been collapsed into three levels. The number of teachers per level was 9, 7, 10 respectively. A cross-tabulation of these levels with the rated helpfulness of the mentor program is illuminating. Clearly, the more topics discussed the higher the rated helpfulness of the program. When little dialogue has occurred between the mentor and protege, the program is viewed as less helpful.

See Table 5

Approximately one-third of the new teachers viewed their mentor as a good friend (see Table 6). This perception of the mentor is consistent with the notion that the mentor should be a special person who has the interests of the new teacher foremost in perspective. For persons who argue that the mandated mentor approach is doomed to failure because a strong personal bond is not present, this information will not support their position. Additionally, for an even larger proportion of teachers (54%). the mentor bond was considered friendly but not a special bond. And, for the clear majority of these new teachers, the mentor program worked well. In fact, the majority of new teachers rated the relationship with their mentor in a positive perspective (85%). A cross tabulation illustrated the association among "levels of the relationship" and "helpfulness of the mentor program." Again, the stronger the friendship bond the more helpful the mentor program was perceived (see Table 7).

See Table 6

See Table 7

The formalizing of mentor programs is a clear trend in education, especially for new teachers. While documentation about these mentor programs is accumulating rapidly, evidence about their success is accumulating more slowly and with mixed results (Jacobi, 1991). This survey of new vocational education teachers is consistent with this mixed pattern. However, several observations are clear.

(1) A statewide mentor program for non-degreed vocational education teachers has produced mixed results. Some teachers benefitted greatly by the program and other teachers were helped very little.

(2) The mandating of the program does not assure compliance. This non-compliance ranged from failure to appoint a mentor to failure to fulfill tasks requested of them. However, non-compliance can be overcome by strict adherence to the state's rules. The more important issue thus becomes can the quality of the mentor program be assured. On this latter point, the results are encouraging.

(3) Both professional development and psychological support were important factors in the range of activities discussed by mentors and their protege. Measured in terms of these topics, the mentor program addressed many concerns and provided the basis for dialogue between the experienced and new professionals.

(4) Both the quality of the relationship and the number of topics discussed were related to the helpfulness of the mentor program. The possible interaction of these relational and topical factors was not examined but it should be explored.

The mentor program for non-degreed vocational education teachers is in the formative developmental stage. An immediate need is to assure compliance at the local level; second is the need to clarify responsibilities; third is the need for in-service education of mentors to assure that tasks are reasonable fulfilled. The information from this survey suggests that a quality program must go beyond compliance. This concern suggests that a critical quality match is needed between the mentor and protege. It suggests that administrators must take several factors into consideration to assure a compatible mentor-protege match. On balance, this study suggests that a mentor program serves a useful purpose.

A substantial number of teachers indicated that professional discussions of problems and psychological support were helpful to them. And, with some fine tuning, the program can positively affect an even greater percent of the new teacher corps.

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TABLE 1

DESCRIPTION OF RESPONDENTS AND MENTORS BY SELECT CHARACTERISTICS

CHARACTERISTIC/OPTIONS		N	%
Age	Under 30	3	10.0
	30 - 45	23	76.7
	Over 45	4	13.3
Gender	Female	10	33.3
	Male	20	66.7
Previous Teaching Experience	Yes	13	43.3
	No	17	56.7
Number of Months in Teaching Position	0 - 4	1	3.3
	5 - 9	29	96.7
Mentor Appointed	Yes	26	86.7
	No	4	13.3
Mentors' Background	Administrator	3	11.5
	Teacher: Same Subject	9	34.6
	Teacher: Voc Subject	13	50.0
	Teacher: Non-Voc Subject	1	3.9
Mentors' Location	Same School	23	88.5
	Different School	3	11.5

TABLE 2

DESCRIPTION OF NEW TEACHER AND MENTOR ACTIVITIES BY SELECT FACTORS (N=29)

FACTOR/OPTIONS		N	%
Initial Meeting	Immediately	21	72.4
	After 1 Month	2	6.9
	2 to 3 Months	0	0
	4 Months or More	2	6.9
	Never	4	13.8
Observations of Teaching	None	11	37.9
	1 - 3	4	13.8
	4 - 6	6	20.7
	7 - 9	3	10.3
	10 or More	5	17.2
Number of Conferences	None	9	31.0
	1 - 3	2	6.9
	4 - 6	2	6.9
	7 - 9	1	3.5
	10 or More	15	51.7
Length of Observation	0 Minutes	9	31.0
	15 or Less	5	17.2
	16 - 30	8	27.6
	31 - 60	5	17.2
	More than 60 Minutes	2	6.9

TABLE 3

FOURTEEN MOST FREQUENTLY NAMED DISCUSSION TOPICS (N=26)

TOPIC	CATEGORY	N
Rules & Consequences	Classroom Management	18
Disciplinary Actions	Classroom Management	18
Attendance/Records	Classroom Management	18
Getting School Started	Getting School Started	17
School Policies	School Business	16
Faculty Meetings	School Business	16
Classroom Organization	Classroom Management	16
Procedures	Classroom Management	15
Relating to Students	Teaching Methods	15
Grading Policies	Assessment & Grading	15
Grade Reports	Assessment & Grading	15
Records	Assessment & Grading	15
Administrators	Relations	15
Parents	Relations	15

TABLE 4

FREQUENCY OF RATED HELPFULNESS OF THE MENTOR PROGRAM BY FIVE OPTIONS (N=26)*

	OPTION	N	%
1)	The best thing that could have happened	3	11.5
2)	Very useful	10	38.5
3)	Good in some aspect but weak in others	6	23.0
4)	It wasn't much help	4	15.4
5)	A real disappointment	3	11.5

*Respondents without mentors were not included in this tabulation.

TABLE 5

CROSS TABULATION: NUMBER OF TOPICS DISCUSSED BY THE RATED HELPFULNESS OF THE MENTOR PROGRAM

		DESCRIPTION OF TOPICS DISCUSSED		
		0-20	21-40	41-60
Helpfulness of Mentor Program	Very helpful	0	0	9
	Mixed	0	2	5
	Little help	6	4	0

TABLE 6

DESCRIPTION OF THE MENTOR AND NEW TEACHER RELATIONSHIP BY FOUR OPTIONS (N=26)

OPTIONS		N	%
1)	Good friends	8	30.8
2)	A friendly relationship - limited to work	14	53.8
3)	Strictly business	4	15.4
4)	Distant/hard to approach	0	0

TABLE 7

GROSS TABULATION: DESCRIPTION OF THE MENTOR RELATIONSHIP BY THE RATED HELPFULNESS OF THE MENTOR PROGRAM

		DESCRIPTION OF RELATIONSHIP		
		Strictly Business	Friendly	Good Friends
Helpfulness of Mentor Program	Very helpful	0	9	5
	Mixed	1	2	3
	Little help	3	2	1

APPENDIX A

TEACHING SPECIALTY OF NEW VOCATIONAL TEACHERS, 1992 - 93 (N=30)

OCCUPATIONAL PROGRAM	N
Cosmetology	5
Health Occupations	5
Building Trades	4
Welding	4
Auto Mechanics	3
Machine Trades	2
Printing	2
Auto Body	1
Drafting	1
Electronic Technology	1
Forestry/Landscaping	1
Marine Mechanics	1

APPENDIX B

OCCUPATIONAL SPECIALIST I

MENTOR - TEACHER ACTIVITY CHECKLIST

The following checklist includes a large number of activities about which new teachers and mentors might exchange information and provide advice.

Check all of those items that apply to you and your mentor during the current school year.

17 ☐ Getting School Started

☐ Classroom Management
  16 ☐ Classroom organization
  9 ☐ Management plan
  18 ☐ Rules/consequence
  15 ☐ Procedures
  18 ☐ Disciplinary actions
  9 ☐ Clean-up (students)
  18 ☐ Attendance/other general records

-- ☐ Curricular Program
  10 ☐ Goals/objectives
  10 ☐ Competency base program
  7 ☐ Course outline
  6 ☐ Lesson planning
  13 ☐ Instructional resources

-- ☐ Teaching Methods/Techniques
  9 ☐ Presenting material
  15 ☐ Relating to students
  8 ☐ Supervising lab practice
  11 ☐ Working with unique students

-- ☐ Student Organizations (e.g., VICA, HOSA, etc.)
  7 ☐ Organizing one
  7 ☐ Serving at advisor
  8 ☐ Types of activities
  9 ☐ Local/regional/state competition

-- ☐ Assessing and Grading
  7 ☐ Test development
  13 ☐ Grading plan
  15 ☐ Grading policies (e.g., attendance, make up, etc.)
  15 ☐ Grade report
  15 ☐ Records

- -- ☐ Operational Supplies/Equipment
  - 11 ☐ Budgeting process/policies of school
  - 13 ☐ Purchasing supplies
  - 11 ☐ Equipment
  - 9 ☐ Accountability
  - 8 ☐ Inventory
  - 10 ☐ Fund raising

- -- ☐ Relations [Activities/Expectations/Roles]
  - 14 ☐ Advisory committee
  - 15 ☐ Administrators
  - 13 ☐ Counselors
  - 15 ☐ Parents

- -- ☐ School Business
  - 17 ☐ School policies [e.g., keys, attendance, etc.)
  - 14 ☐ Department meetings
  - 16 ☐ Faculty meetings
  - 9 ☐ Special duties [e.g., lunch, bus, games, etc.]
  - 10 ☐ Safety
  - 13 ☐ Emergency procedures
  - 9 ☐ Yearly calendar
  - 13 ☐ Laws/policies affecting students and teachers
  - 13 ☐ Substitutes

- -- ☐ Personal Business
  - 10 ☐ Salary schedule
  - 10 ☐ Pay schedule
  - 10 ☐ Benefit options
  - 9 ☐ Vacation time
  - 12 ☐ Sickness
  - 11 ☐ Professional days
  - 5 ☐ Summer school/adult evening opportunities

- -- ☐ Professional Development
  - 12 ☐ PDP [Professional Development Plan]
  - 4 ☐ University courses
  - 3 ☐ University degree programs
  - 4 ☐ Technical up-dating
  - 6 ☐ Basic skills development
  - 7 ☐ Program suggestions [e.g., workshops, contacts, etc.]

- -- ☐ Personal Matters, Advice, 'Booster Shoots'
  - 6 ☐ Excessive work load/finding time
  - 9 ☐ Discouragement
  - 9 ☐ Performance evaluation by administrator
  - 11 ☐ Stress
  - 9 ☐ Other 'private matters' [don't name it]

EVALUATION OF CALIFORNIA'S TECH-PREP EDUCATION PROGRAM

Initial Evaluation Findings and Common Research Challenges

Michael Rubin
Evaluation and Training Institute
312 Fair Oaks St.
San Francisco, CA 94110-3617
(415) 648-7817

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This project was supported by the Carl D. Perkins Vocational and Applied Technology Education Act of 1990 (Title III, Part E), P.L. 101-392, with funds administered by the Chancellor's Office, California Community Colleges.

"The activity which is the subject of this report was supported in whole or in part by the U.S. Department of Education. However, the opinions expressed herein do not necessarily reflect the position or policy of the U.S. Department of Education, and no official endorsement by the U.S. Department of Education should be inferred."

Paper presented at the
American Educational Research Association Meeting
New Orleans, Louisiana
April, 1994

INTRODUCTION

> *America may have the worst school-to-work transition system of any advanced industrial country . . . . The lack of any clear, direct connection between education and employment opportunities for most young people is one of the most devastating aspects of the existing system.*

These comments from America's Choice: High Skills or Low Wages! (1990) embody two driving forces behind current school-to-work reform efforts. First, these reforms link national economic prosperity to the acquisition of higher skills and knowledge by the American workforce. Economic, technological, and demographic changes all influence the need for expanded technical preparation of the work force. New technology in particular is creating a demand for workers with increased computational, communication, science, and problem-solving skills. Second, the current reforms assert that the isolation of education from the world of work has had a detrimental effect for the majority of students. Put simply, too many students leave school ill-prepared to find or hold gainful employment. Taken together, both views outline a central role for education in preparing students for the future.

"Tech-Prep" is an outgrowth of this reform movement and is currently one of the most powerful educational restructuring efforts being implemented nationwide. At the national and state level, there is hope that Tech-Prep programs will successfully integrate classroom learning with the world of work and prepare students for the transition from school to work. As stated in the 1990 Carl D. Perkins Vocational and Applied Technology Act (VATEA), Tech-Prep programs "*offer an alternative to the traditional 'college prep' program. Tech-Prep is specifically aimed at equipping youth with the technical and academic skills required to compete in a rapidly changing global economy.*"

What is Tech-Prep?

Tech-Prep targets the "neglected majority" of students currently enrolled in the general high school curriculum but who do not complete baccalaureate degrees. These students participate in a course of study presently characterized by its lack of coherent structure and sequence (Parnell, 1985; Powell, Farrar & Cohen, 1985). Tech-Prep, on the other hand, is education with a career focus, emphasizing education and training opportunities beyond high school. In place of the general high school curriculum, students build competence in mathematics, science, and communication skills through a four-year, sequential, non-duplicative course of academic and vocational studies beginning in grade 11. In particular, Tech-Prep differs from traditional vocational education programs by providing a "2+2" model of a four-year program that combines a common core of learning with technical education. Students prepare for a broad array of occupations through a combined academic and vocational education program which ends with an associate degree or certificate from a community, technical, or junior college, or a two-year apprenticeship.

Tech-Prep represents a reform trend focused on articulation and integration between the secondary and postsecondary segments in order to improve the credentials, certification, and transition of students into successful employment. The implementation of articulation agreements between the secondary and postsecondary levels ensures that students enrolled in a Tech-Prep program are prepared for higher education. These formal articulation agreements provide students with a non-duplicative sequence of progressive achievement, leading to competencies in a Tech-Prep education program. Coordination between high schools and colleges facilitates the successful completion of course prerequisites and sequential electives which parallel the college-prep course of study. By combining high expectations with clear goals, Tech-Prep offers students an alternative to the four-year college-prep program of study while at the same time, guaranteeing students the option to pursue a college degree.

The heart of the Tech-Prep program lies in this partnership commitment between academic and vocational educators, between secondary and postsecondary institutions, and between education and the business community. Tech-Prep programs begin with an organizational structure—commonly referred to as a consortia or articulation council—that includes the participation of faculty, administrators, counselors, and outreach staff from local educational agencies at the secondary and postsecondary levels, along with business, industry, and labor representatives.

Yet Tech-Prep is more than mere articulation, but rather a re-conceptualization of the nature of the curriculum for training a more flexible, knowledgeable, and technically-adept workforce. To this end, Tech-Prep programs offer:

- continuity in learning, which eliminates disjointed courses and supports a coherent program of study for secondary students;
- context-based teaching, replacing job-specific vocational training with an "applied academics" curricula connected to real-life situations, activities, and problems;
- competency-based teaching, which integrates academic and vocational programs in order to deliver academic basic skills through hands-on learning approaches and to provide students with the competencies required for entry-level employment; and
- communication between learning institutions, linking secondary and postsecondary levels of education to provide continuity to the learning process and better prepare students for further education and lifelong learning.

As part of the Tech-Prep program, students choose an occupational "cluster" (e.g., engineering; technology; applied science; mechanical, industrial, or practical arts or trades; agriculture; health; consumer studies; or business) that reflects their individual interests and post-high school goals. With the help of comprehensive career guidance and counseling plans, this occupational cluster approach simultaneously exposes students to "real world" experiences while providing a solid educational program based on a clear structure and sequence of courses for students.

The broad range of occupations within each cluster ensures that students from different academic and family backgrounds will interact more frequently. By grouping students on the basis of their interests and goals, Tech-Prep reduces the misconception that vocational education is a "dumping ground" for students with poor academic records and/or behavioral problems (National Commission on Secondary Vocational Education, 1985).

This occupational clustering also facilitates the aforementioned integration of academic and vocational education. Academic subjects are taught "in context", allowing students to apply abstract knowledge in an hands-on learning environment. In addition, teachers from different academic and vocational disciplines are given common preparation time to coordinate and design curricula which enables them to "team teach" applied academic courses (Grubb, Davis, Lum, Plihal & Morgaine, 1991). Thus, Tech-Prep is designed to support reducing the traditional polarization between academic and vocational branches of learning.

Tech-Prep also advocates the development of school programs with a distinctive orientation and curriculum. Typically, these "focus schools" incorporate a strong mission or theme within a tightly-knit organization of supportive teachers and administrators (Hill, Foster & Gendler, 1990). These programs may exist as schools-within-schools, occupational magnet schools, or youth academies, and often use partnerships with business and the community to provide students with opportunities for interaction with the world of work and to supplement educational resources with up-to-date equipment and expertise (California Department of Education, 1991).

The Results So Far

Tech-Prep efforts, as described by Hull (1993), are anticipated to result in several positive outcomes for all participants. Specifically, Tech-Programs are designed to:

- provide access to skills, education, and career for the changing technological workplace;

- offer a clear focus and direction to students, who in turn become more focused, interested, and achieving;
- provide a solid academic foundation in applied science, mathematics, technology, and communications;
- satisfy the needs of business and industry in training new workers to compete in today's marketplace;
- teach valuable, sophisticated, technical skills; and
- offer protection against career obsolescence.

Based on the initial experiences of schools and districts currently implementing Tech-Prep programs throughout the U.S., the greater articulation between secondary and postsecondary educational institutions has increased enrollment in postsecondary institutions. The focus of Tech-Prep on educational structure and planning has resulted in decreased student drop-out rates and increased student attendance. Along with the elimination of out-moded and unresponsive vocational programs, schools operating Tech-Prep programs have increased enrollment in higher-level mathematics courses, and heightened overall career awareness among students. Moreover, increased decision-making at school sites has encouraged the development of stronger linkages between schools, their surrounding communities, and private businesses.

Yet national assessments of Tech-Prep efforts by such groups as the National Center for Research on Vocational Education, the American

Association of Community and Junior Colleges, and others, outline the various challenges facing these programs. In particular, former U.S. Director of Vocational-Technical Education Winifred Warnat noted several Tech-Prep implementation concerns, including: limited participation by all members of local consortia, including business and industry representatives; little allowance for pre-tech-prep preparation; need to expand access to Tech-Prep programs to all students; cursory articulation agreements; inadequately designed curriculum; and the nominal involvement of employers and higher education in the developmental effort. Such challenges compound the successful implementation of the systemic changes associated with Tech-Prep Education programs across local, state, and national levels.

Federal Implementation of Tech-Prep

The groundswell of support for Tech-Prep grew rapidly in conjunction with the re-authorization of the 1984 Carl D. Perkins Vocational Education Act. The development of Tech-Prep programs was given impetus by the enactment of the 1990 VATEA legislation, which included Tech-Prep as a cornerstone of the new mandate. In 1990, Title III, Part E of VATEA formally authorized the development of four-year Tech-Prep education programs. VATEA defines Tech-Prep education programs as a combined secondary and postsecondary program that:

- leads to an associate degree, two-year certificate, or two-year apprenticeship;

- provides technical preparation in at least one field of engineering technology; applied sciences; mechanical, industrial, or practical art or trade; agriculture; health; or business;
- builds on student competence in mathematics, sciences, and communications, through a sequential course of study; and
- leads to placement in employment and/or transfer to a four-year baccalaureate degree program.

More specifically, in order to receive funding under Section 344 Title III, Part E of VATEA, all Tech-Prep programs must incorporate seven key components:

1) *development of an articulation agreement between secondary and postsecondary participants*;
2) *design and implementation of an educational program with a common core of required proficiency in mathematics, science, communications, and technologies which leads to an associate degree or certificate in a specific career field*;
3) *inclusion of Tech-Prep education program curricula appropriate to the needs of secondary and postsecondary students*;
4) *in-service training for teachers capable of (a) training teachers to effectively implement Tech-Prep curricula; (b) provide joint training for teachers from all secondary and postsecondary participants; and (c) may include provisions for weekend, evening, and summer sessions, institutes, or workshops*;
5) *training programs for counselors designed to enable counselors to (a) recruit students for Tech-Prep programs ; (b) ensure successful completion of Tech-Prep programs; and (c) ensure appropriate employment placement*;
6) *equal access to the full range of Tech-Prep programs for individuals from special populations*; and

7) *preparatory services that assist all populations.*

"Equal access" refers to providing an opportunity for special population students (educationally disadvantaged, economically disadvantaged, single parents, disabled, limited-English proficient, etc.) to enter Tech-Prep programs equal to that afforded to the general student population. "Preparatory services" speaks to services, programs, or activities designed to assist individuals who are not enrolled in vocational education programs in the selection of or preparation for participation in an appropriate vocational or training program. Preparatory services may be provided to students before grade 11, and include services or programs related to outreach or recruitment of potential vocational education students, career counseling and personal counseling, vocational assessment and testing, and other appropriate services, programs, or activities.

All states have begun implementation of Tech-Prep Education initiatives in response to this federal legislation. The U.S. Department of Education has taken an active stance in support of Tech-Prep education, providing technical assistance and discretionary grants to the states. Local Tech-Prep programs have been specifically designed in accordance with the general Tech-Prep model to account for the varying contexts of the individual states. Details on California's Tech-Prep strategy follow:

California's Tech-Prep Education Program

An important priority for California's educational system is providing educational programs that address the current shortage of technically competent employees. Technology has both drastically changed the process of production and raised the skill levels required of employees. Consequently, California has utilized the substantial funding authorized under Title III of VATEA to support the establishment and operation of four-year Tech-Prep education programs. The budget for Tech-Prep is jointly administered by the Chancellor's Office of the California Community Colleges and the California Department of Education (CDE). In the first year of VATEA funding, nearly $6 million was received in California specifically targeted for Tech-Prep efforts. In year two, nearly $10 million was allocated for these programs, and nearly $12 million in expenditures is anticipated for the 1993-94 program year.

As part of the development California's State Plan for Vocational and Applied Technology Education Act Funds 1991-1994, a statewide advisory committee comprised of representatives from both the secondary and postsecondary segments prepared a formal strategy for use of these Tech-Prep funds. Three statewide priorities were identified in support of Tech-Prep efforts: integration and sequencing of academic and vocational education curricula; development of curricula and program strategies reflecting workplace needs; and instructional and support services responsive to the needs of students from special populations. The Tech-Prep Education plan for California includes four primary goals relating to these main priorities:

- establishing a formal structure for articulation within each community college district service area for the development of Tech-Prep programs;
- developing Tech-Prep education programs to provide a course of study for the middle quartiles of students with undetermined career goals;
- expanding current articulation efforts to all segments of secondary/higher education within the state; and
- increasing statewide awareness of the benefits of participating in these programs.

Three main program components were established in support of these Tech-Prep goals: 1) local Tech-Prep education consortia; 2) six statewide resource consortia; and 3) three special statewide projects (guidance and outreach, student follow-up, and evaluation). An overview of these three program elements is presented below:

Tech-Prep Local Consortia

In 1991, the Chancellor's Office administered funds for the establishment of local Tech-Prep consortia throughout the state. These consortia were required to develop three-year plans describing how the specific components of Tech-Prep Education programs and performance criteria as outlined in VATEA would be accomplished.

Funds to local consortia were allocated based on community college participation in each consortium. However, late receipt of VATEA funding to California during 1991-92 resulted in delays in the announcing and awarding of the competitive Tech-Prep grants and contracts. Ultimately, in 1991, some 65 local consortia were funded through the Request for Application (RFA) process. For each college in a consortium, the maximum award was $30,000 in the first year, with $77,625 available in year two. However, some eligible recipients did not apply; other applications did not meet all of the program criteria. In 1992, ten additional sites applied for and were awarded Tech-Prep funds. By January of 1994, 83 local consortia have become operational with participation from all 106 community colleges in California. Nearly 400 secondary partners (including secondary schools, ROC/Ps, and adult schools), and 200 postsecondary institutions (including community colleges, California State University and University of California campuses, and private colleges) are involved in these 83 consortia. Over 500 businesses are also involved statewide in these Tech-Prep Education efforts.

Table 1 describes the local consortia in terms of their major vocational program area emphasis. The major program areas are grouped into five broad categories: agriculture; business; consumer studies; health sciences; and industrial technology. As seen in the Table, the majority of consortia targeted the industrial technology (59 consortia) or business program areas (58 consortia). Thirty-two consortia emphasized health sciences, followed by twenty-nine programs targeting consumer studies. Only six consortia have focused Tech-Prep efforts on agriculture.

Moreover, local consortia could target more than one program area as part of Tech-Prep developmental efforts. Twenty-six consortia (31 percent of the total) targeted two program areas. A total of 25 consortia (30 percent) emphasized just one program area, and 24 local consortia (29 percent) focused efforts on three program areas. Six percent of all consortia emphasized four program areas, while just three consortia (4 percent of the total) targeted all five major vocational program areas.

Table 1
Tech-Prep Local Consortia By Major Vocational Program Area

Fiscal Agent	Program Areas					Total
	Agriculture	Business	Consumer Studies	Health Sciences	Industrial Tech.	
Allan Hancock Joint CCD		●				1
Antelope Valley UHSD		●		●		2
Baldwin Park USD		●				1
Baldy View ROP		●	●		●	3
Butte CCD	●	●	●	●	●	5
Cabrillo CCD					●	1
Capistrano-Laguna Beach ROP		●				1
Cerritos CCD		●		●	●	3
Chabot-Las Positas CCD					●	1
Citrus CCD			●		●	2
Coast CCD		●		●	●	3
Compton CCD		●	●		●	3
Contra Costa CCD			●	●	●	3
Desert CCD		●			●	2
Eden Area ROP[*]					●	1
El Camino CCD[*]					●	1
Feather River CCD[*]				●	●	2
Foothill-DeAnza CCD		●		●	●	3
Fremont-Newark CCD[*]		●		●		2
Gavilan Joint CCD			●	●	●	3
Glendale CCD		●	●		●	3
Grossmont-Cuyamaca CCD		●			●	2
Imperial Valley ROP		●	●	●		3
Kern CCD	●	●	●	●	●	5

(continued)

Fiscal Agent	Program Areas					Total
	Agri-culture	Busi-ness	Consumer Studies	Health Sciences	Industrial Tech.	
Lake Tahoe CCD*		●				1
Lassen CCD*	●				●	2
Lemoore UHSD		●				1
Long Beach CCD*		●	●		●	3
Los Angeles CCD (East Los Angeles)		●			●	2
Los Angeles CCD (City College)		●				1
Los Angeles CCD (Harbor College)*		●				1
Los Angeles CCD (Mission College)			●		●	2
Los Angeles CCD (Pierce College)		●				1
Los Angeles CCD (Southwest College)*					●	1
Los Angeles CCD (Trade-Tech College)*			●		●	2
Los Angeles CCD (Valley College)*		●	●		●	3
Los Angeles CCD (West Los Angeles)		●	●		●	3
Los Rios CCD (American River College)				●	●	2
Los Rios CCD (Cosumnes River College)*		●	●		●	3
Los Rios CCD (Sacramento City College)		●	●	●	●	4
Marin CCD		●		●	●	3
Mendocino-Lake CCD		●		●		2
Merced CCD			●		●	2
MiraCosta CCD*		●			●	2

(continued)

Fiscal Agent	Program Areas					Total
	Agri-culture	Busi-ness	Consumer Studies	Health Sciences	Industrial Tech.	
Mission Trails ROP		●	●	●	●	4
Napa Valley CCD		●		●		2
North Orange County CCD (Cypress College)				●		1
North Orange County CCD (Fullerton College)		●				1
Palomar CCD					●	1
Palo Verde CCD*		●	●	●		3
Pasadena Area CCD				●		1
Peralta CCD		●		●	●	3
Rancho Santiago CCD		●		●		2
Redwoods CCD					●	1
Rio Hondo CCD				●	●	2
Riverside County Office of Education		●		●	●	3
Saddleback CCD					●	1
San Bernardino County Office of Education		●		●	●	3
San Diego CCD			●		●	2
San Francisco CCD					●	1
San Joaquin County Office of Education	●	●	●			3
San Jose Evergreen CCD		●			●	2
San Luis Obispo CCD*		●				1
San Mateo County CCD (Cañada College)		●			●	2
San Mateo County CCD (Skyline College)		●	●			2
San Mateo County UHSD		●			●	2
Santa Barbara CCD		●				1

(continued)

Fiscal Agent	Program Areas					Total
	Agri-culture	Busi-ness	Consumer Studies	Health Sciences	Industrial Tech.	
Santa Clarita CCD		●	●			2
Santa Monica CCD		●			●	2
Sequoias CCD	●	●		●	●	4
Shasta-Trinity ROP*	●	●	●	●	●	5
Sierra Joint CCD					●	1
Siskiyou Joint CCD		●	●		●	3
Solano County CCD		●		●		2
Sonoma County CCD*					●	1
Southwestern CCD		●		●	●	3
State Center CCD		●			●	2
Ventura County Supt. of Schools		●	●	●	●	4
Victor Valley CCD		●		●	●	3
West Valley-Mission CCD (Mission College)					●	1
West Valley-Mission CCD (West Valley College)		●	●		●	3
Yosemite CCD		●	●	●	●	4
Yuba CCD		●	●		●	3
TOTAL	6	58	29	32	59	

* First-year Tech-Prep consortia (1993-94)

Source: **Chancellor's Office Tech-Prep Program Inventory (12/93)**

Moreover, in 14 of the 83 consortia (17 percent of the total), membership has consisted of multiple community colleges within any one district. A total of 37 of the 106 community colleges (35 percent of the total) are involved in these multi-district Tech-Prep local consortia. The number of community colleges participating in these multi-campus consortia ranges from 2 to 4, with most multi-district programs involving two community colleges in any given service area.

Tech-Prep Resource Consortia

Through a similar, competitive RFA process, CDE established six Tech-Prep resource consortia. The goal of these resource consortia is to accelerate and disseminate the establishment of fully-developed and effective Tech-Prep education program models. These resource centers host visitors and share curriculum materials and teacher in-service training programs with local consortia. In particular, the resource consortia provide the following services to the local consortia:

- model curricula integrating a common core of required proficiency in a designated occupational area;
- professional development programs and materials; and
- dissemination and replication of technical assistance materials.

Both the statewide priorities and the goals and activities of the resource consortia are planned to coincide with those for the local Tech-Prep Education consortia. The primary difference between the resource consortia and local consortia is their size and scope, rather than overall direction.

One resource center was established for each of the six major program areas: agriculture; business education; engineering technology education; health careers; home economics; and industrial and technology education. In addition to the general services provided by all six consortia, each of the Resource Consortia has established specific goals addressing the needs of the individual vocational program areas.

Due to delays in state requirements for bidding, only five of the six centers were awarded funds at the conclusion of the 1991-92 program year. The agriculture center was awarded in 1993. Table 2 outlines the six resource consortia currently operational in California by program area.

Table 2
Tech-Prep Resource Consortia

Program Area	Fiscal Agent
Agriculture	Stanislaus County Office of Education
Business	Allan Hancock Joint CCD
Consumer Studies	San Joaquin County Office of Education
Engineering Technology	Los Rios CCD/American River College
Health Sciences	Kern High School District
Industrial Technology	State Center CCD

Tech-Prep Statewide Projects

In addition to the Tech-Prep local consortia, the Chancellor's Office has provided funds to three statewide special projects through the competitive RFA process. The statewide outreach and guidance project, directed by the State Center Community College District, provides assistance to local consortia in developing common materials to promote and publicize Tech-Prep programs throughout the state. In addition, this project specifically targets outreach and guidance materials for students from special populations to support student recruitment efforts.

A statewide student follow-up project, under direction of the San Diego Community College District, works in concert with the statewide evaluation effort to develop a monitoring system to track student progress across educational segments and ultimately, from school to work. Finally, the evaluation project (whose findings are detailed in this report) provides assistance in terms of federal accountability requirements, and local and state program improvement. The Evaluation and Training Institute (ETI), working with the San Diego Community College District, is conducting this five-year evaluation of California's Tech-Prep Education program. The findings from this effort will also serve to improve statewide teaching techniques and curriculum materials as part of the development and implementation of Tech-Prep education programs.

METHODOLOGY

This evaluation of California's Tech-Prep Education program has been designed specifically to assess overall program effectiveness. In particular, this five-year research study focuses attention on developing a statewide assessment that highlights four key areas of concern:

1) a description of California's Tech-Prep education efforts;
2) an assessment of program implementation;
3) an evaluation of program effectiveness; and
4) the identification of effective program implementation strategies.

The evaluation takes a holistic approach, providing both process and outcome information regarding the implementation and administration of the Tech-Prep Education program in California. The evaluation design is based on a partnership perspective to evaluation, with an emphasis on program improvement and regular, on-going feedback to key stakeholders. This proactive and comprehensive approach is designed to yield both formative findings from immediate program improvement, and summative findings as a measure of program effectiveness and impact.

Further, the conceptual approach to the study examines four critical elements:

- the environment in which the Tech-Prep programs operate;

- the attitudes, values, interests and perceptions of state and local staff, administrators, faculty, counselors, students, and business and industry representatives;
- program and participant outcomes; and
- the seven main components of Tech-Prep programs outlined in the VATEA legislation.

All of these elements taken together offer the best overall perspective of California's Tech-Prep education effort. In addition, this evaluation design has been developed to coincide with the blueprint for the federal evaluation of Tech-Prep, so that local and state observations can be compared with findings at the national level.

A combination of qualitative and quantitative data support the formative and summative aspects of this research study. Evaluation activities during this first year included: reviewing current materials and documentation; conducting observational assessment of program efforts; attending state and national Tech-Prep conferences; conducting informal state-level interviews; developing draft evaluation instrumentation; coordinating state evaluation activities with federal evaluation efforts and statewide student follow-up; and providing technical assistance to local Tech-Prep consortia. Each of these efforts is detailed below:

Reviewed Documents
Members of the evaluation team conducted a detailed review of key program documents, including state and local plans, proposals, and

other pertinent reports. Marketing materials and other related items were also examined to assess compatibility with program goals and objectives. Program documentation was provided by the Chancellor's Office and the local Tech-Prep consortia.

In addition, materials from other Tech-Prep programs from across the nation were collected and reviewed to gain a better understanding of Tech-Prep efforts and alternative strategies for Tech-Prep program design and implementation. Federal level publications regarding Tech-Prep, as well as scholarly literature on these efforts, were also examined to provide a complete context for understanding these new educational programs.

Conducted Observational Assessment

Evaluation team members undertook observational assessment of all aspects of program implementation in this first year of the evaluation. This activity included attendance at all statewide Tech-Prep Project Director meetings, Applied Academics workshops, statewide planning meetings, and other related events. Evaluation team staff also informally observed several local Tech-Prep consortia meetings and program activities to gather details on local-level implementation efforts, successes, and concerns.

Attended State and National Tech-Prep Conferences

Evaluation team representatives attended state and national Tech-Prep conferences and meetings to ensure that the evaluation design incorporated state-of-the-art techniques and approaches from other state and locally-directed evaluation efforts. Presentations on the California model were also made at these conferences, sharing information and findings to a broad, national audience.

Conducted State-Level Interviews

Informal interviews were held with state staff responsible for Tech-Prep and related vocational education programs on an on-going basis. The purpose of these interviews was to review the compatibility of Tech-Prep Education programs with state policy goals, the integration of vocational and applied academics, staff perceptions of program design, implementation, and overall effectiveness, and recommendations for program improvement. These informal interviews were conducted at times convenient for state staff throughout the program year.

Developed Initial Evaluation Instrumentation

In collaboration with Chancellor's Office staff, evaluation team members developed draft formal evaluation instruments for use in the 1993-94 program year. The content of these data collection materials was based on the review of key Tech-Prep implementation issues as outlined in this report. Evaluation instruments included: interview guides for staff, administrators, faculty, and counselors for in-depth site visits to a statewide sample of local consortia; and a written survey of key business and industry representatives from local Tech-Prep consortia to examine program impact and satisfaction with Tech-Prep activities.

Linked With Federal Evaluation Efforts

Evaluation team members initiated close coordination with Mathematica Policy Research as part of their federal evaluation of Tech-Prep efforts for the U.S. Department of Education. The initial California evaluation design included a statewide written survey of all local grant recipients. However, after a review of the comprehensive survey prepared by Mathematica, evaluation team members, and the Chancellor's Office agreed to coordinate study efforts with Mathematica in order to reduce the data reporting requirements from the field. Consequently, Mathematica has agreed to provide the California evaluators with data from local California Tech-Prep sites obtained from the national 1993-94 written survey. Findings and conclusions based on this national database will be included as part of the Year Two Evaluation Report.

Coordinated Efforts with Student Follow-Up Project

Evaluation team staff have worked closely with California's statewide student follow-up project as part of pilot student data collection efforts. It was initially anticipated that all local consortia would have students participants by the 1993-94 program year, so that student data collection could begin in the fall of 1993. However, it was quickly realized by

Chancellor's Office, evaluation team members, and representatives from the statewide student follow-up project that this projection for student enrollment was overly optimistic, given the need for curriculum development and professional training before formal student participation in Tech-Prep efforts. Only a small number of local Tech-Prep consortia are expected to have the capability to enroll students beginning in 1994. Consequently, evaluation team staff have concentrated efforts on planning for student data collection, through such efforts as: identifying appropriate data elements (such as participant satisfaction with the program, demographics, placement rates, program completion, etc.); assessing student intake forms; and reviewing the overall student follow-up process and data reporting mechanisms.

Provided Technical Assistance

Finally, evaluation team members have provided technical assistance to local consortia on evaluation concerns as requested throughout this first year of the evaluation. Such assistance included support in establishing local goals and objectives, detailed discussion of state and federal evaluation plans, and consultation on local student data collection strategies.

OVERALL FINDINGS

Based on the evaluation activities noted above, the evaluation team has identified several key findings regarding California's Tech-Prep Education program during its first year of operation. These observations, described below, are presented in terms of local-level program implementation and impact, and state-level program design and implementation.

Local-Level Program Implementation and Impact

Initial Headway in Local Consortia Development
Researchers from the National Center for Research in Vocational Education have identified four key phases in Tech-Prep program development (Bragg & Huffman, 1991; Dornsife, 1992). The first phase involves the participation of key groups in the planning process, including the formulation of a local philosophy and vision, and design of adequate organizational structures. The second phase includes the development of specific Tech-Prep program components, such as local policies, articulation agreements, professional development, marketing and outreach, and business and industry collaboration. The third phase centers on putting Tech-Prep into action, through specific implementation strategies and the recognition and handling of possible barriers. The final stage involves evaluation of program efforts and outcomes to ensure continuous quality improvement.

Following this developmental framework, the local Tech-Prep consortia in California have generally succeeded in this first year with respect to the first phase of program growth. Predictably, local programs have only begun to address issues related to the second and third phases of program implementation. More specifically, local consortia have begun detailed efforts to develop solid coalitions for Tech-Prep efforts as part of first-year funding efforts. Specific activities in this regard have included:

- numerous consortia meetings and other occasions designed to establish a common mission and vision for the consortia, mutually-beneficial goals and objectives, and specific timelines for project activities;
- in-service training regarding the Tech-Prep movement and specific program elements for faculty, counselors, and administrators to increase the level of awareness and interest in Tech-Prep; and
- joint professional development efforts, including faculty summer institutes and after school workshops, for secondary and postsecondary instructors to meet together to discuss curriculum and instructional practices.

Progress was not uniform across all seven of the legislated components of Tech-Prep efforts in this first year. Yet given the developmental nature of Tech-Prep programs, it was not expected that all seven components would be fully operational during the first year of the program. The majority of local program efforts in this first year have focused attention on administrative start-up of the local consortia, and the establishment of a common framework for Tech-Prep efforts. Local consortia have generally succeeded in providing in-service training to administrators, teachers, counselors, and other staff in this regard.

However, program staff for the most part have just initiated efforts to design the formal Tech-Prep program sequence, based on a common core of required proficiency and associated articulation agreements. Further, the vast majority of local consortia have concentrated program developmental efforts at the secondary level. Although recognizing the importance of curriculum development at postsecondary institutions, program staff have focused initial efforts primarily at the earlier stages of Tech-Prep program development. Finally, local consortia have just started to address preparatory services as part of Tech-Prep efforts. The work of the Tech-Prep guidance and outreach special project has been instrumental in providing materials to local consortia to support this growing statewide emphasis on preparatory services. Local consortia have also recognized the need to provide Tech-Prep programs and services to all students, including students from special populations. Most local consortia plan to include the message of Tech-Prep within established programs designed to serve special populations, rather than developing additional "stand alone" access efforts.

Accelerated Progress of Past Articulation Efforts

Those local consortia with past articulation experience ("2 + 2" or "2 + 2

+ 2" projects in particular) appear further along the developmental process than those projects just beginning Tech-Prep efforts. These accelerated partnerships have used prior articulation activities, articulation councils, and pre-existing linkages among faculty as a launching point for expanded Tech-Prep efforts, even when in different program areas than initial "2 + 2" related efforts. Faculty and staff from these programs already had a strong understanding of the Tech-Prep concept. Consequently, program staff could concentrate efforts in this first year on curriculum development and the establishment of articulation agreements, unlike the majority of local consortia who focused attention on developing administrative structures and formulating program mission and vision. As noted by one project director:

> *Our major strength was the existing 2 + 2 articulation partnership. We have been working very hard for the past five years in breaking down turf barriers, bringing educators together, establishing trust, identifying factors of support and deterrence, and essentially moving through the challenges associated with a major change. This has, I believe, allowed us to move faster than those consortia who have either not established 2 + 2 articulation agreements previously, or have failed in early articulation program development.*

Valued Use of CORD/AIT Materials

The Chancellor's Office and CDE jointly purchased Tech-Prep applied academic course curriculum materials developed by the Center for Occupational Research and Development (CORD) and the Agency for

Instructional Technology (AIT). Materials were purchased for Tech-Prep courses in applied mathematics, applied biology/chemistry, applied communications, and principles of technology. The Tech-Prep guidance and outreach special project conducted a series of statewide workshops to introduce and review these materials to administrators and teachers involved in Tech-prep efforts throughout the first year.

These curricula and related materials have been highly valued by local consortia staff as key resource tools in the establishment of Tech-Prep Education programs. More important, the local consortia have not simply adopted the CORD/AIT curricula wholesale, but rather have begun looking at specific approaches to enhance and adapt these materials to meet specific, local needs. These supplementary materials offered a key foundation for local consortia, particularly in terms of providing concrete examples of the application of the concepts behind Tech-Prep for instructors at all levels. These materials have served as a starting point for Tech-Prep curriculum development efforts, offering particular illustrations of the translation of the Tech-Prep approach into specific curricula models and frameworks.

Joint Academic and Vocational Planning

Tech-Prep has served as an initial catalyst to bring academic and vocational faculty together for joint planning, often for the first time. In particular, focused discussions have centered on issues of curriculum, instructional practices, and strategies for student success in school, the workplace, and in lifelong learning.

Moreover, there has been growing recognition of the relationship between Tech-Prep efforts and other, broader statewide school reform initiatives. Tech-Prep is moving away from being seen as an add-on "vocational program" and instead as part of the larger statewide school reform process, based on "Second to None" and other California models. In particular, both "Second to None" and Tech-Prep incorporate similar key elements, such as: articulated programs; integrated vocational and academic programs; a strong core curriculum; authentic assessment; support systems for students; powerful teaching and learning; restructured schools; and new professional roles. Both initiatives share similar goals, and local consortia staff have recognized the importance of both initiatives operating simultaneously as part of a comprehensive reform strategy.

Nevertheless, some resistance to the Tech-Prep effort was offered in this first year, particularly from the academic arena. In several local consortia, Tech-Prep was seen as just another vocational education program, a "flash-in-the-pan" effort that would quickly disappear. High school faculty and counselors were often reluctant to fully engage in the kinds of activities necessary to design a Tech-Prep program as well as continue restructuring in light of the "Second to None" mandate without the clear support, direction, visibility, and leadership of district and school administrators. Additionally, the concept of "applied" mathematics and science was often undervalued and scorned by the academic faculty. For instance, some instructors did not view "Business Mathematics" courses as "true" mathematics worthy of study. This attitude was noted by faculty from both the secondary and postsecondary segments alike. According to one project director:

> *The experiences of year one shows that much more work is needed to promote faculty-to-faculty dialogue and understanding than was anticipated, especially between vocational and traditional transfer-oriented faculty. We have found that the foundation for developing a tech-prep curriculum rests with all K-12 faculty, and until acceptance is reached at that level, tech-prep reform efforts are doomed to failure.*

Reduced Career Counseling Support

As presently designed, Tech-Prep emphasizes the use of counselors to provide guidance and outreach to all potential students, including those from special populations in compliance with VATEA regulations. VATEA recognizes the importance of counselors as part of the preparatory services for Tech-Prep students, and the significant role of career guidance in Tech-Prep education. However, given the current fiscal situation, most secondary school districts in California have eliminated or are actively considering the elimination of counseling staff as a fiscal savings. This reduced counseling staff directly impacts the ability of the Tech-Prep programs to provide adequate and appropriate outreach to all students.

The Chancellor's Office has responded to the cutbacks in counseling staff by sharing various outreach and guidance strategies with the local consortia. The Tech-Prep guidance and outreach special project has designed counseling and guidance materials to ensure uniformity and consistency at the state level. Students from the local community colleges have also been recruited to serve as peer counselors to promote Tech-Prep efforts. Finally, instructors in Tech-Prep programs have often taken on the role of counselors, promoting Tech-Prep activities and services to students. Nonetheless, the limited availability of counseling staff statewide questions the long-term viability of career counseling activities, which is central to the Tech-Prep effort.

Limited Business and Industry Involvement

Business, industry, and/or trade association representatives have not been as intensely involved in these initial Tech-Prep efforts as initially anticipated. In this respect, the implementation of Tech-Prep in California parallels national trends. While the business community is formally represented on every local consortia, the active participation of these individuals in program activities in a meaningful way is not consistent statewide. Despite the often high expectations reported by business and industry representatives, limited knowledge about the exact role for business, industry, and labor in the local Tech-Prep consortia has hindered business involvement. In many cases, business representatives have signed on to local Tech-Prep consortia without a full understanding of the roles and responsibilities of businesses in this effort. In particular, business and industry representatives appear uncertain of specific ways in which industry could support Tech-Prep efforts. Further, organized labor appears generally absent from most local Tech-Prep consortia in any meaningful sense.

Common Obstacles in Local Consortia Development

Four main obstacles faced the local Tech-Prep consortia in this first year of funding. First, the late receipt of VATEA funds in California resulted in a delay in approving and disbursing funds to the local and resource consortia, as well as the three statewide special projects. As a result, project timelines had to be readjusted, and the scope of first year efforts was reduced.

Second, limited understanding of the Tech-Prep concept in the field hindered immediate implementation of program efforts. While local consortia staff understood the general idea and principles behind Tech-Prep, differences in interpreting the specifics of the legislation, and in defining a "bona fide" Tech-Prep program, slowed program development. As noted by one project director:

> *The challenge of creating effective collaboration between secondary and postsecondary institutions is enormous both in the possibilities for major educational reform and the demands such responsibilities place on participants in this endeavor. Bridging the historical disjuncture between academic and vocational education requires a significant investment in time and the allocation of resources.*

Third, general resistance to change, particularly such a substantial change as promised by effective Tech-Prep efforts, generated some opposition to Tech-Prep efforts. As noted above, this opposition was seen most frequently from the academic faculty. Tech-Prep involves a new conceptualization of educational programs and a new partnership between academic and vocational faculty, which, like any new innovation, takes time both to understand and to realize. Related to this idea of change was problems with turf; turf with respect to vocational and academic programs, and turf in terms of secondary and postsecondary institutions and programs. Breaking down the traditional barriers between levels of education, between academic and occupational education, and between education and employers remains an on-going challenge for California's local Tech-Prep programs.

Finally, limited time available for planning and articulation meetings slowed project progress in this first year. This lack of time for faculty and other meetings was compounded by the current state budget situation, which restricted supplemental resources for these additional activities. In particular, release time needed for Tech-Prep curriculum planning, articulation meetings, and the development of worksite-based learning experiences could not be fully supported to the degree necessary for the extensive curriculum review and revision activities generated by Tech-Prep. The general fiscal climate for education in the state has led to apprehension and fears about trying to accomplish the significant change associated with Tech-Prep during this time of diminished resources. Yet, as noted by some project staff:

> *We always try to portray Tech-Prep as a solution to existing problems, not as a whole set of new problems. It is a tool for secondary schools to accomplish restructuring. It is an opportunity for community colleges to receive better-prepared students, ensure a flow of students into career/vocational programs, and it creates an opportunity to enhance existing programs to better meet the demands of the current and future workplace.*

State-Level Program Design and Implementation

Limited Statewide Direction of Program Efforts

The progress in the implementation of Tech-Prep from a statewide perspective has taken longer than originally anticipated in this first program year. Limited staffing at the state agencies has hindered the provision of technical assistance to the local consortia in the development of Tech-Prep efforts. More important, organizational challenges raised by having two different agencies coordinate the implementation of Tech-Prep statewide (including internal communication between state agencies, and between the agencies and the local consortia) has limited the growth of Tech-Prep efforts. Long-standing communication challenges between the two coordinating state agencies has also impeded program implementation. For instance, as stated by one project director:

> *The lack of united support from the Chancellor's Office and CDE has created a barrier to high school commitment to Tech-Prep. High schools are committed to "Second to None" but given no direction regarding Tech-Prep and the ways in which these efforts complement each other.*

Although state staff at the Chancellor's Office have responded positively to the implementation of Tech-Prep, it is impractical to expect that just two vocational education specialists can coordinate, supervise, and monitor the 83 local consortia projects, in addition to their on-going responsibilities unrelated to Tech-Prep. In general, statewide leadership of Tech-Prep has lacked both the vigor and the direction needed for the implementation of such a widespread and innovative reform effort as represented by Tech-Prep within California.

Challenges Defining Tech-Prep Education Programs

It is difficult to avoid designing Tech-Prep efforts to conform with a specific Tech-Prep model, rather than including a broader focus on the larger reform strategy to restructure curriculum. Yet despite the legislation which outlines the nature of Tech-Prep programs and specific program components, substantial confusion remains statewide in terms of determining a "bona fide" Tech-Prep program. Specific questions to be addressed in this regard include:

- Must all seven legislated components of a Tech-Prep program be fully operational before a "bona fide" Tech-Prep program can be considered to exist?
- Must the postsecondary components of a Tech-Prep program be completely established before a "bona fide" Tech-Prep program is judged operational?
- Are all four areas in the common core of required proficiency (applied mathematics, communication, science, and technology) required before a Tech-Prep program is considered a "true" Tech-Prep effort?
- At what point is a student who has participated in a Tech-Prep program judged a "bona fide" Tech-Prep student for follow-up purposes?
- Can Title III funds be used to purchase materials and/or train teachers to teach CORD/AIT materials for students in grades 9 and 10, or to support students entering a community college without benefit of Tech-Prep programs in grades 11 and 12?

Similar concerns arise when considering the nature of articulation agreements. As stated in the federal regulations, an articulation agreement is a commitment to a program designed to provide students with a non-duplicative sequence of progressive achievement leading to competencies in a Tech-Prep education program. However, clear guidelines for such agreements remain to be established. Past evaluations of "2+ 2" and "2 + 2 + 2" efforts, both in California and nationally, have shown that too often, articulation agreements are superficial and static. In many instances, these agreements are only paper commitments cementing incomplete secondary-postsecondary relationships. As noted by Winifred Warnat:

> *The tech prep program is not automatically established by an articulation agreement. The success of a program relies on a strong, participative, and on-going relationship of mutual benefit and interdependency between both secondary and postsecondary players, from initial planning through placement.*

Ultimately, the dynamic nature of Tech-Prep programs has hindered the formal definition of a Tech-Prep program and a Tech-Prep student, impacting statewide student follow-up and evaluation efforts. With only the federal legislation to guide state staff, policy questions have multiplied regarding state program operation that remain unanswered.

Uncertain Relationship Between Local and Resource Consortia

The connection between the local and six statewide resource consortia remains unclear in the field, particularly in terms of curriculum development efforts. Local sites are working on curriculum efforts at the same time as the resource consortia; the roles and responsibilities of the two different types of statewide programs consequently remains vague and has not been formally communicated to the field. Further, the resource consortia are implementing various professional development programs, and plan to disseminate model Tech-Prep curricula, which in many cases conflicts with and directly contradicts some of the Tech-Prep developmental efforts at the local level. The specific activities of the six resource consortia, and the ways in which these statewide consortia can assist local efforts, remains unclear to staff from most local programs, despite the overall intent of the resource consortia to complement local developmental efforts.

In contrast, the Tech-Prep special projects have demonstrated substantial progress in this first year. The guidance and outreach project in particular has undertaken substantial activities to promote and disseminate information about the Tech-Prep initiative statewide. Specific activities have included: development of statewide program logo, video, and formal marketing campaign, with various premiums including T-shirts, calendars, cups, pens, and clocks; coordination of statewide in-service training events in applied academic courses for faculty and administrators; and development of a Tech-Prep statewide informational newsletter.

Similarly, the statewide student follow-up project has succeeded in preliminary efforts to identify appropriate follow-up strategies. Key data elements to include in the follow-up process have been determined, and initial follow-up forms that can be computer-scanned have been devised. Pilot testing of the follow-up system at the secondary level is also being undertaken at nine sites statewide in the 1993-94 program year, so that the follow-up system will be fully operational by 1994-95.

Difficulties in Multi-Campus Programs

Communication and coordination of program efforts across large multi-campus consortia have posed more substantial challenges than originally envisioned. As noted earlier, 17 percent of local programs are involved in multi-campus consortia, with the participation of some 37 colleges statewide. Yet in some of these cases, consortia partners were only informally aware of the extent and responsibilities associated with being a part of a Tech-Prep partnership. Vast distances between institutions joined in larger consortia also limited interactions. In one extreme instance, key faculty and administrators in an outlying institution were just incidentally informed of and active participants in their local Tech-Prep consortia. As described by one project director of a multi-district consortia:

> *The size of our consortium and the diversity of the colleges and high schools within our boundaries presented a challenge for communicating concepts, ideas, and information. We also encountered a tremendous variation in understanding and acceptance of Tech-Prep.*

Articulation Concerns with Four-Year Colleges

Tech-Prep has not been envisioned solely as a four-year program, but rather as a vehicle to provide opportunities for students to continue their education as desired beyond two-year colleges. Yet little discussion has centered on the extent to which Tech-Prep courses will satisfy the "a-f" entrance requirements of the University of California and California State University systems, in those cases where a Tech-Prep student desires to continue the educational process at four-year colleges and universities. The extent to which Tech-Prep programs and courses are designed to allow for transfer across educational systems remains to be clarified at the state level.

Establishment of Tech-Prep Efforts in Impacted Program Areas

The Tech-Prep Education program is based on a grade 11-14 educational continuum. As noted earlier, the majority of local program efforts in this first year have emphasized program start-up and development at the secondary level. Only limited focus has centered on the transition from secondary to postsecondary level. In this regard, some Tech-Prep programs appear to have been established in vocational program areas with impacted enrollments at local postsecondary institutions. Local programs have yet to address the implicit notion of guaranteed admission and acceptance into Tech-Prep programs at the college level. Graduates of Tech-Prep programs might assume that participation in a Tech-Prep program serves as a guarantee for postsecondary study in a particular program area; however, impacted enrollments in these particular programs at the community college would serve to dissuade students from participating in Tech-Prep efforts. Little attention has yet focused on the extent to which priority registration rights would be guaranteed to Tech-Prep program participants at the postsecondary level.

Appropriateness of Tech-Prep Education For All Program Areas

A key foundation of Tech-Prep activities has been the establishment of a national program to avoid training in low-skill, low-paying jobs that inhibit effective competition in the global marketplace. However, several of California's Tech-Prep efforts target areas which appear to counter this emphasis on high-paying, high skill employment. For example, programs in child development and child care generally offer the potential for only low-wage jobs, countering the main emphasis of the Tech-Prep education program. Hence, the extent to which state efforts should continue to support these Tech-Prep programs remains questionable.

COMMON RESEARCH CHALLENGES AND RECOMMENDATIONS FOR CHANGE

Common research issues have emerged from the above findings that impact any evaluation of a Tech-Prep program. Clearly, implementation of Tech-Prep takes time—often much more time than initially anticipated. A successful evaluation must be flexible to adapt to this ever-expanding timeline of Tech-Prep impelmentation and program development. Evaluation designs must also be flexible to adjust to changing circumstances at the local level, including modifications in program design, discipline focus, timeframe, etc. For example, implementation of new (and in some instances, competing) educational initiaves can often hinder the determination of direct correlation between Tech-Prep activities and the improvement in student performance by Tech-Prep students.

Moreover, as noted above, issues of defining Tech-Prep programs and students have a direct impact on research and evaluation. A common standard must be identified in order to report student and program data accurately. Finally, given the growing importance of Tech-Prep as part of the national education picture, it is important to recognize the poltiical nature of any evaluation. External pressures to identify successful practices and models often fail to account for the long-term nature of student follow-up in determining impact of Tech-Prep efforts. In sum, all of these research issues must be reviewed in the design of any evaluation of Tech-Prep efforts.

In consideration of the above findings and research challenges, the evaluation team offers the following four recommendations for both local and statewide Tech-Prep program improvement in California. These recommendations derive from the review of implementation of Tech-Prep efforts in this first full year of funding, and include the following:

Recommendation 1: Statewide coordination and leadership of the Tech-Prep Education program should be strengthened.

A key factor in the progress of the Tech-Prep programs beyond initial administrative start-up relies on strong leadership and oversight from the state agencies. However, both limited staffing and organizational challenges within the agencies has hindered the ability of state staff to coordinate statewide Tech-Prep initiatives, provide adequate oversight, and offer relevant and appropriate technical assistance to the local consortia. Field staff are anxious for clear signals in terms of statewide priorities, needs, and direction. Consequently, the evaluation team recommends that the CDE and Chancellor's Office expand coordination efforts and provide frequent communication to the field regarding the Tech-Prep Education program. Such efforts could include on-going dissemination of successful local practices, problem-solving strategies, and information from other, related national programs. In addition, the relationships between Tech-Prep and School-to-Work, JTPA, apprenticeship, and other reforms efforts, including the California Partnership Academies, should also be communicated to the field on a frequent basis.

In addition, greater statewide coordination will enable resolution of on-going issues regarding Tech-Prep efforts that require state policy decisions. As noted above, these issues include: articulation with four-year institutions; the question of Tech-Prep program development in locally-impacted program areas; the need for greater coordination between local and resource consortia; and definitions of "bona fide" Tech-Prep efforts and articulation agreements.

Recommendation 2: Business, industry, and labor involvement in local Tech-Prep consortia should be expanded.

Business, industry, trade associations, and organized labor have only been nominally involved in Tech-Prep efforts in this first program year. Yet a key element of the Tech-Prep program highlights the importance of business and industry involvement in these efforts. Tech-Prep cannot work without the support, participation, and sanction of employers. The evaluation team thus recommends that state staff and representatives from the local consortia encourage the active and involved participation of business, industry, and labor. Business representatives need to know what is expected of them as part of the Tech-Prep effort; the traditional relationship between business and education has created expectations which do not necessarily apply in the Tech-Prep setting. Specific suggestions of ways in which industry could support Tech-Prep efforts include:

- identifying skills and competencies as part of the curriculum development process;
- offering mentoring opportunities, job-shadowing, and internships;
- sharing facilities and equipment;
- providing specific job-placement assistance;
- offering career counseling for students;
- team-teaching in the classroom; and
- serving as role models for Tech-Prep students.

Recommendation 3: The participation of academic faculty in Tech-Prep efforts should be increased.

The evaluation team recommends that to support the integration of academic and vocational programs as outlined in the Tech-Prep Education program, the involvement of academic faculty from both the secondary and postsecondary level should be expanded. While academic faculty have been involved in planning efforts this first year, as noted above, some resistance has been noted from the academic sector to Tech-Prep Education efforts. On-going staff development opportunities between vocational and academic faculty should be scheduled frequently, with clear mechanisms established for the sharing of information on a consistent basis. Academic faculty should be encouraged to view the benefits of Tech-Prep programs to students, parents, schools, business, and communities in order to expand their support of these initiatives. Similarly, the link between Tech-Prep and the more "academically" focused school reform initiatives (such as "Second to None") should be augmented to further encourage participation by the academic sector in Tech-Prep efforts.

Recommendation 4: Greater opportunities should be provided for local consortia to communicate with each other.

The evaluation team recommends that additional opportunities be provided to local consortia to meet, network, and share information and ideas regarding Tech-Prep program implementation and curriculum development. These meetings should be held on a regional basis, and should focus on expanded opportunities for the sharing among participants of program successes, challenges, and opportunities for growth and expansion. State staff could coordinate such local meetings under the direction of the Tech-Prep guidance and outreach special project. In addition, local consortia staff should be encouraged to use the Ed>Net and associated electronic bulletin boards frequently to communicate and share ideas.

However, local staff need to be encouraged to take the initiative to make contact with regional programs on a frequent basis, independent of state-organized conferences. The Tech-Prep Program Inventory, published by the Chancellor's Office, provides an initial step to encourage such communication efforts. On-going updates of the information in this resource guide should encourage more frequent communication among local consortia.

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PREPARING TECH PREP TEACHERS: A NEEDS ASSESSMENT

Tim L. Wentling
Chris A. Roegge
Debra D. Bragg

Department of Vocational and Technical Education
College of Education
University of Illinois at Urbana/Champaign

A Paper Presented at the Annual Meeting of The American Educational Research Association, Special Interest Group on Vocational Education.
New Orleans, LA April 8, 1994

INTRODUCTION

Technical Preparation, or Tech Prep, has become the focus of considerable attention within the education community. State and federal funds are being allocated for the development and implementation of Tech Prep programs. Thus far the major burden for Tech Prep program development and implementation has fallen on secondary teachers, administrators and counselors. As Tech Prep progresses, practitioners are asking the question "When and how are teacher educators going to get involved with Tech Prep?" The Illinois Board of Higher Education (IBHE), the Illinois Community College Board (ICCB) and the Illinois State Board of Education (ISBE) issued a challenge to teacher education faculty in Illinois to respond to this question.

As an initial step in the process, the University Council for Vocational Education in Illinois, representing the nine universities in Illinois which provide vocational teacher training (The University of Illinois at Urbana/Champaign, Eastern Illinois University, Governors State University, Chicago State University, Northern Illinois University, Western Illinois University, Southern Illinois University-Edwardsville, Southern Illinois University-Carbondale, and Illinois State University) commissioned this needs assessment. Part I outlines Tech Prep from a national viewpoint, including legislative provisions. Part II describes (and focuses on the findings of) the specific needs assessment activities conducted in Illinois. Part III explicates implications and recommendations for preparing Tech Prep teachers.

PART I: THE CONCEPT AND DEFINITION OF TECH PREP

Overview

The concept of Tech Prep began over two decades ago when educators at the federal level and in selected states contemplated educational reform linked to vocational education in high schools and community colleges (Dornsife & Bragg, 1992). Even though the concept of Tech Prep was introduced at that time, it was not until the 1980s that Tech Prep gained national attention when Dale Parnell authored the book entitled *The Neglected Majority* (1985). In it, Parnell described the Tech Prep Associate Degree (TPAD) as a way to reform general education curricula by better serving the middle two quartiles of America's secondary school population, hence the 'neglected majority'.

Parnell believed Tech Prep should "blend the liberal arts with the practical arts without diluting the time-honored baccalaureate degree/college prep track" (1985, p. 140). Following in Parnell's foot prints, others have argued more recently for an educational approach that can begin to address the needs of a large proportion of youth that are not well served by the current process of American schooling (W. L. Grant Commission on Work, Family, and Citizenship, 1988; Commission on the Skills of the American Workforce (1990). Contemporary arguments made on behalf of Tech Prep include the following:

- The United States has a failing system of school-to-work transition for most of America's youth and adults, especially those who have chosen non-college options (Commission on the Skills of the American Workforce, 1990). This argument suggests education is a responsibility of society (at least the entire community) and must involve schools as partners with business, industry and labor to prepare youth for the future.
- The shortcomings of traditional instructional approaches and findings from cognitive psychology about how individuals learn best lend support to a Tech Prep approach. By providing a real-world context for learning, Tech Prep can engage students in learning a vast array of skills and knowledges, particularly those traditionally thought to belong in academic subjects (e.g., math, English, science). (For additional reading that supports this argument, we refer you to recent issues on educational reform in the *Educational Leadership* journal.)
- The overlap of educational services across levels of education, particularly between secondary schools and two-year postsecondary institutions, seems to be costly and unproductive use of resources (Dornsife, 1992). The argument for 'smooth pathways' views Tech Prep as a means of supporting continued educational experiences for individuals who have gotten lost (dropped out) or

trapped between systems and for better efficiency across systems as a means of better utilizing scarce resources (e.g., funds, personnel, facilities).

- The importance of better educating youth and adults to be productive workers in a globally competitive workforce. This argument recognizes that the United States is competing in a global marketplace where foreign competitors' workers are more highly trained and productive than her own (Commission on the Skills of the American Workforce, 1989; Secretary's Commission on Achieving Necessary Skills, 1991).

During the 1980s, while the nation was embroiled in educational reform, interest in the concept of Tech Prep grew but relatively few programs were actually put into place. McKinney, Fields, Kurth, and Kelly (1989) found in a national survey of secondary and postsecondary educational institutions engaged in articulation programs for at least three years that fewer than ten percent were using a Tech Prep approach. Stern reported that there were only 122 Tech Prep programs operating in the United States as of June 1990 (Nothdurft, 1990). Therefore, while the need for Tech Prep appeared to be apparent to a growing number, the impetus to put such programs into practice seemed to be missing. In 1991, the nation found the direction it needed to perpetuate the concept of Tech Prep: the Tech Prep Education Act.

Federal Legislation on Tech Prep

On July 1, 1991, Title III of the Carl D. Perkins Vocational and Applied Technology Education Act of 1990, The Tech Prep Education Act, came into being. This major piece of federal legislation for vocational education, which continued a long history of federal support for vocational education in the United States, indicated that

> Tech Prep education programs mean a combined secondary and postsecondary program which:
>
> 1. leads to an associate degree or 2-year certificate;
> 2. provides technical preparation in at least 1 field of engineering technology, applied science, mechanical, industrial, or practical art or trade, or agriculture, health, or business;
> 3. builds student competence in mathematics, science, and communications (including through applied academics) through a sequential course of study; and
> 4. leads to placement in employment (Title III, Tech Prep Education Act).

Seven essential elements of Tech Prep required by the federal law are:

1. Articulation agreement. Consortium members must commit to a program that provides a non-duplicative sequence of courses specified in a signed articulation agreement.

2. Appropriate curriculum design. The Tech Prep curriculum must contain a 2+2 sequence of courses beginning in the 11th grade and culminating in the 14th grade. The program must contain a common core of courses in mathematics, science, communications, and technologies leading to an associate degree or certificate in a specific career field.
3. Curriculum development. A consortium must show that it has undertaken a specific curriculum development effort on behalf of Tech Prep.
4. In-Service teacher training. A consortium must provide in-service training for teachers from all consortium participants.
5. Counselor training. A consortium must provide training for counselors in how to recruit students and consequently help them to complete Tech Prep programs and find employment.
6. Equal access for special populations. A consortium must ensure that members of special populations have the same opportunity to enter a Tech Prep program as all other students.
7. Preparatory services. A consortium may engage in outreach, career counseling and vocational assessment and testing to students not aware or involved in Tech Prep programs, including students below the 11th grade (Brustein, 1993).

While not required by the legislation, the following are recognized in Title III as preferred components of a Tech Prep program:

- Effective employment placement activities or transfer to 4-year baccalaureate-degree programs
- Development of Tech Prep programs in consultation with business, industry, and labor unions
- Drop-out prevention and re-entry and provisions to meet the needs of minority youths, youths of limited English proficiency, youths with handicaps, and disadvantaged youths.

Federal appropriations to support this legislation have grown steadily since authorization from the original appropriation of $66 million for the 1992 fiscal year. Current federal appropriations, just two years later, nearly double the FY 1992 figure.

Critical Processes of Tech Prep

Given these federally-mandated components of Tech Prep, many unique but highly related processes define the Tech Prep approach. Bragg (1992) presented the following processes as the basis for the Tech Prep approach:

- Program articulation - linking courses, programs of study, and curricula within educational systems to create smooth transitions and reduce potential drop-out, failure, and costly inefficiencies for students and educational organizations.
- Curriculum integration - blending or merging of subject matter to create more "authentic" learning experiences, specifically the blending of academic subject matter (i.e., math, science, communications, social studies) with occupational/technical content to create realistic learning opportunities.
- Career awareness, exploration, and development - attention paid to the need to structure the way youth learn about and explore careers. This may occur through structured career education classes, through work-based learning experiences such as youth apprenticeships, or through in-school experiences structured through curriculum organized around career clusters or school academies.
- Organizational and individual collaboration - created shared responsibility for education among all stakeholders (e.g., educators, students, parents, employers, community agencies) to increase ownership for improved education. An outgrowth of this view of education includes involving parents, employers, and other citizens as mentors and teachers for students. There is an active and on-going exchange of information to enhance the student's learning experiences.
- Shared leadership - cooperation among teachers, administrators, community representatives, parents, students, and others in decision making about what education should mean and how it should be delivered to best meet the needs of today's students.
- Human resource development - especially (and maybe only) at the postsecondary level for specific career fields, a goal of Tech Prep is to prepare individuals for employment in "high skill, high wage" jobs necessary for maintaining or enhancing economic competitiveness.

Tech Prep Outcomes

Viewed as a whole, Tech Prep can viewed as having a number of preferred outcomes of significance to students, educational institutions, and the community at large. These outcomes include:

- Enhanced learning and academic progress for students - by creating more relevant, active, and integrated educational opportunities
- Increased faculty involvement - by empowering faculty to become actively involved in decision making and curriculum development

- Increased efficiency in the total education system - by strengthening administrative and curricular efforts across all levels of education
- Improved work force preparation - by creating for students a more academically- and technically-challenging pathway to careers
- America's youth for citizenship, further education, and productive employment
- Increased community confidence in public education - by demonstrating accountability and value in public education

Summary

Many believe that Tech Prep provides a vehicle for meaningful and lasting reform of secondary education. At the very least, it offers a new paradigm for secondary school instruction. How should teacher education be changed to properly prepare individuals to teach under this new paradigm? The remainder of this paper is dedicated to addressing that question.

PART II: ILLINOIS NEEDS ANALYSIS ACTIVITIES

Overview

In response to a challenge issued by IBHE, ICCB and ISBE to address Tech Prep teacher preparation issues, the University Council for Vocational Education in Illinois initiated a needs assessment activity. The purpose was to determine the subject area content and pedagogical preparation needs and priorities of prospective Tech Prep teachers. Four distinct research and/or synthesis activities were conducted. Each activity is briefly described below, followed by a synthesis of the results.

Identification of reform initiatives in Science, Mathematics and English

Reform in science education has tended to focus on what to teach rather than how to teach it, although instruction is gradually attracting more attention. The Project 2061 Report, published by the American Association for the Advancement of Science in 1989, presented goals for science, technology and math literacy. The Project has three major phases, of which two have been partially completed. *Science for All Americans* delineates and recommends knowledge and skills in science, math and technology that students need to learn in secondary school and to retain thereafter. The concept of social responsibility was included in these goals, as it has been in other reform efforts in science education. *Benchmarks for Science Literacy* , the second phase of Project 2061, details the progress that needs to be made in specific school years toward achieving the goals laid out in phase one. In the final phase, *Models, Blocks and Blueprints*, practical components of the curriculum will be developed and presented, and recommendations for making cross-discipline connections will be made. The project relies on teams made up of cross-grade and cross-subject students and teachers for successful implementation.

Another recent reform movement in science education, Science, Technology and Society (STS), has a somewhat different focus. Rather than centering on academic preparation and subject area content concerns, STS attempts to offer multidisciplinary instruction in the real world. Students use the discovery process to study issues that have many dimensions, to come up with alternative approaches, and to consider the positive and negative consequences of those paths. STS places science in its sociocultural context by studying history, values and ethics alongside the more traditional content. Social responsibility is a key ingredient in the mix. An outgrowth of STS is *issues-based instruction*, which is an attempt to combine the values and processes associated with both democracy and science by providing students with the knowledge, skills, and opportunities to investigate, evaluate and decide about a real science-related social issue. STS intends to empower students to use the values, habits, knowledge, and processes of both science and democracy to cope with both personal and societal decisions.

Reform in mathematics education has been, in contrast to science education reform, somewhat more concerned with how to teach than what to teach. The National Council of Teachers of Mathematics (NCTM) detailed what students should learn in *Curriculum and Evaluation Standards for School Mathematics*, published in 1989. In 1991, NCTM released *Professional Standards for Teaching Mathematics*, which describes how mathematics should be taught. The thrust of both of these efforts is to teach students to solve non-routine problems in meaningful contexts. Major breaks with traditional instructional approaches in mathematics include seeing students as learning through induction rather than memorization; focusing the instructional process on guided inquiry rather than the didactic, tell-and-test approach; and espousing assessment methods that are open-ended rather than machine-scorable. An exploratory, real-world approach to teaching and learning mathematics is recommended throughout. The importance of applications in this approach is evident. Researchers have found that, using this approach, all students, not just those considered the brightest, can learn mathematics; that pure math is learned in concert with applied math ; that more students can participate in mathematics activities; that applications provide opportunities for teachers to extend instruction to include more abstract topics (Usiskin, 1993).

The Standards Project for English/Language Arts is a collaborative effort by the Center for the Study of Reading at the University of Illinois, the International Reading Association, and the National Council of Teachers of English. This Department of Education supported effort seeks to develop standards that differ from past reform activities in ambition, scope and grounding. The goal of the project is to develop standards that promote equality of educational opportunity and higher academic achievement for all children. Three task forces, one each for elementary, secondary and postsecondary levels, are charged with preparing frameworks, standards and vignettes for different grade levels. The developed standards will incorporate the best theory, research and practice in the field.

The development of standards for any educational endeavor requires the co-development of accurate assessment measures. In a draft report on Standards for the Assessment of Literacy, the Joint Task Force on Assessment states that the basic purpose of schooling has shifted from knowledge transmission to nurturing independent learning and inquiry. This shift comes in response to an increased need for individuals in the workforce with strong problem-solving skills. The emphasis on inquiry shifts the center of assessment from static knowledge assessment instruments to a holistic exploration of the educational environment and the degree to which all participants support the development of inquiry.

Instructional issues include shared learning opportunities, group collaboration, peer mentoring, and the broad inclusion of diverse materials that increase awareness and provide relevance within the individual's context of learning. Assessment issues include authentic measures such as portfolios, extended oral and written responses to reading, extensive essay tests with multiple scoring means, and one-on-one or small group conferences.

Survey of Administrators

The people who have responsibility for initiating and facilitating the implementation of Tech Prep -- the administrators -- were viewed as important stakeholders in the preparation of Tech Prep personnel. Consequently, a survey was conducted to foster a better understanding of administrator perceptions and needs as they pertain to Tech Prep teachers.

Twelve secondary school administrators with experience in leading local Tech Prep initiatives were surveyed by mail. The administrators responded to eight open-ended questions which addressed major performance or competence needs of Tech Prep teachers. An analysis of results of the survey indicate that the following are important characteristics which Tech Prep teachers should possess:

Collaborative Skills

- Communication skills, both writing and verbal
- Problem-solving skills, group decision making
- Effective team participation, team building, leadership, participation
- Flexibility, adaptability, especially with regard to Change
- Innovation and creativity
- Respect and value for all disciplines

Technological Skills

- Competence in multiple computer applications, more than surface knowledge, real competency
- Ability to teach, model, demonstrate technological expertise
- Experience in design, development, and use of various media, instructional technology

Diverse, Real-World Experience

- Internships in business and industry
- Experience in business and industry beyond educational roles

- On-the-job (Work) experience in vocational education area

Integration Skills

- Educational program which includes both vocational and academic curriculum.
- Interdisciplinary knowledge, competency in related fields

Application Skills

- Ability to design applied curriculum, relevant to students, and realistic

Articulation Skills

- Ability to work with secondary and post secondary faculty and staff to develop and coordinate Tech Prep programs
- Thorough understanding of the conceptual framework of Tech Prep
- Ability to communicate (to sell) with outside entities about Tech Prep

Teaching Skills

- Knowledge of a variety of teaching methods based on learning theory
- Competence in using various teaching methods to appeal to a variety of learning styles
- Objective-based focus
- Ability to use various assessment strategies/systems

Commitment to lifelong learning

Professionalism

Focus Group with Tech Prep Teachers

In early 1993 a focus group interview was conducted with a selected group of secondary Tech Prep practitioners. Subject areas represented by the group were: English/communications, business, physical science, technology, mathematics, and administration. The purpose of this interview was to identify both general and specific elements which should be included in a Tech Prep teacher preparation or inservice staff development curriculum. The general questions which were used to guide the interview were:

- What is your specific role in your school's Tech Prep program?
- Why did you become involved in Tech Prep?
- Based on your experiences, how would you define Tech Prep?
- What is different about "tech prep teaching?"
- In what areas do you feel you were unprepared to teach Tech Prep?
- What would you look for in a Tech Prep teacher?

The two-hour discussion was recorded both on audio tape and with observer notes. Transcriptions of the tapes were content analyzed by tallying how often specific concepts, terms or issues recurred during the discussion. The transcription analysis was then compared to the observer notes which were taken during the session.

Analysis of the interview transcript revealed that the group's comments centered around three predominant themes: teaching techniques, content, and general (stakeholder) insights about teaching and teachers.

Teaching Techniques

- use of cooperative learning strategies
- use of experiential learning techniques
- willingness to relinquish total control of the learning environment
- collaborative and teaming approaches
- vocational/academic integration
- opportunity for prospective teachers to experience these methods

Content

- students must see present or future applications
- teachers need workplace experience
- emphasize affective domain
- communications skills
- computer skills

General Insights (characteristics needed by Tech Prep teachers)

- willingness to take risks
- energetic
- experienced in the workplace
- adaptability
- mentoring

Concept Mapping With Tech Prep Stakeholders

The purpose of this study was to provide a clear operational description of Tech Prep in Illinois as perceived by those who were involved with Tech Prep at various levels. This was accomplished through the use of a concept mapping procedure with administrators, teachers, counselors, state staff, and employers as participant/respondents. A multi-stage process involving mail survey, multidimensional scaling analysis, and group interpretation was used to identify components of Tech Prep programs and rate the relative importance of the components.

The following, listed in order of priority, were identified as important major elements of Tech Prep: Outcomes, Planning and Support, External Involvement and Support, Articulation/Integration, Benefits, Enrollment Incentives, Staff Development, and Populations Served.

Throughout these major component areas, several themes emerged:

- communication among all involved in planning and delivering Tech Prep
- collaborative relationships
- expanding the repertoire of teaching techniques
- application of academic knowledge and skills
- curriculum grounded in mathematics, science and communications

Importantly, the overriding theme which encompasses several clusters is *collaboration*: between educators and employers and between educators and educators, collaboration for support, for developing articulation, for program delivery, and for staff development.

PART III: IMPLICATIONS AND RECOMMENDATIONS FOR TEACHER PREPARATION

Synthesis of Findings: Critical Themes

Several common themes emerged from the four research and synthesis activities. These themes, delineated below, form the basis for subsequent recommendations. Combined, they form the Tech Prep "paradigm" mentioned at the beginning of this paper. Though they are discussed independently, these themes are truly interdependent.

Teaching/Learning Through Application

Tech Prep curricula must be grounded in the foundations of mathematics, science, and language arts. The traditional approach for delivering these skills (transmitting information from teacher to student via lecture) must be altered or even abandoned in favor of methodologies which allow students to learn needed skills in the context within which the skills are used in the real world. In Tech Prep, the workplace provides this context. This theme represents simultaneously Tech Prep's greatest potential for broad reform and the most threatening aspect of carrying out that reform, because teaching through application requires each of the subsequent themes to be in place as well.

This theme has dual implications for teacher preparation. First, teachers must be able to apply their subject matter specialty in a real-world context. Second, preservice teacher candidates must have more opportunities, prior to their first "real" teaching job, to apply the pedagogical skills they have learned.

Student-Centered/Inquiry-Based Instruction

This instructional approach goes hand-in-hand with teaching through application. While teaching through application addresses differences in student learning styles, using a student-centered/inquiry-based teaching approach enhances the students' ability to work cooperatively or independently, to think critically and to solve problems as they encounter them in various situations. It also emulates the climate of the workplace much more closely than traditional, teacher-centered instruction.

The implication is that prospective teachers need to (a) learn how to use this type of approach, (b) be taught using this type of approach, (c) have this type of approach modeled, and (d) practice using this type of approach. Obviously, this represents a departure from the dominant methodology which is modeled in many college and university courses. Adoption and use also require willingness on the part of teachers to relinquish some control of the learning situation. This is perhaps its most difficult aspect.

Vocational/Academic Integration

The so-called "vocational" and "academic" or "college preparatory" educational tracks have been separated by an ever-widening intellectual, philosophical and perceptual chasm. Always implied, in the 1980s preparation for baccalaureate education became firmly entrenched as the penultimate goal of secondary education. Unfortunately, traditional college preparatory instruction does not adequately serve a majority of secondary students. Meanwhile, vocational programming, through a continual narrowing of focus, suffered the image of the educational weak sister, preparing students only for the most menial of jobs. A national "movement" for vocational/academic integration has grown over the past 10 years. Tech Prep provides a vehicle through which integration may be accomplished. Integration may happen without Tech Prep, but Tech Prep cannot happen without integration.

First, teacher education courses should devote a significant portion of instruction to integration. A considerable amount of research and development has been conducted on the subject, resulting in products pertinent to curriculum development, instructional design and teaching methodology. In addition, university teacher educators should address policy issues which are beyond the scope of practitioners but have great impact on integration, such as requirements for teacher certification and, perhaps most importantly, university admission.

Collaboration

Tech Prep absolutely requires one form of collaboration, that being articulation. Articulation entails collaboration between educators of different levels (most particularly, secondary and community college) and between educators and individuals/groups/agencies outside of education (e.g., employers, business leaders, labor).

To be effective, integration (and by extension, Tech Prep) also requires collaboration between peer educators within an institution or level. Simply put, an individual teacher cannot combine subject matter expertise, extensive knowledge of how his or her subject matter is applied in the workplace, technical expertise in an occupational field, and the ability to apply the latest pedagogical techniques, in a complete package. Among all of the resources available to classroom teachers, none is closer at hand or more easily accessible than the knowledge, experience and skill of their peers.

University schools and departments of education tend to be quite compartmentalized, yet the purpose is to prepare teachers, administrators and counselors to fulfill roles in a common setting. The role of teacher educators should include showing prospective teachers how their specialty connects and contributes to the overall educational mission and, perhaps more importantly, how schooling can and should be more purposefully connected to the community at large. The groundwork needs to be laid for teacher educators from different disciplines to collaborate in designing interdisciplinary courses.

Real World Experience

Many who are teachers have never worked outside of the teaching role. The only frame of reference they possess through which to relate knowledge and experience is the school culture. Unfortunately, it has been demonstrated that the school culture differs significantly from that of the workplace in which most students will eventually be required to function. The ability of a teacher to relate subject matter to their own work experience inestimably enhances their credibility in the eyes of their students.

Accelerated programming and alternative certification approaches for "second-career" teachers are being explored. For many years vocational teacher candidates have been required to possess 2000 hours of work experience in their area of specialty in order to be certified. For practicing teachers in Illinois, the Vocational Instruction Practicum (VIP) summer experiences are a means to upgrade knowledge of workplace applications. Related work experiences should be a criteria for selecting prospective teachers, or a component of their preparation, or both.

Recommendations for Immediate Action

Though short-term solutions are just that and will not sustain the meaningful reform potential of Tech Prep, there are strategies which can be initiated now. By doing so teacher education programs can demonstrate to the field commitment to reform and initiate longer-term visions (see next section).

1. In order to facilitate applications-based teaching, teachers could be trained to use and/or adapt commercial applications-based curriculum materials either as stand alone courses or to supplement self-developed courses. Further, in-field teachers could be assisted in converting their existing courses of study, where appropriate, to applications-based instruction via inservice workshops, summer courses, and the like.
2. Preservice field experiences should be of longer duration and should include experiences with teachers disciplines other than (but related to) that of the teacher candidate. Mentor-teachers should be identified who exemplify the desired characteristics of Tech Prep teachers identified in this study. Student teaching and other early field experiences should be intensive and very closely supervised.

3. Student-centered, inquiry-based teaching methodologies should become the standard for Tech Prep teacher preparation. One option is to adapt a specific, well-defined, well-researched student-centered teaching methodology to other disciplines.
4. Preservice teacher education programs should contain a workplace experience component. This could either be a course in the required sequence or a requirement which teacher candidates meet individually. For in-field teachers, summer work experiences could be combined with university instruction and graduate credit awarded. Also, Masters degree/certification programs should be developed and other alternatives explored to facilitate efficient preparation and certification of second career teacher candidates.
5. Application and review processes for teacher candidates should be modified to allow candidates to emphasize, and place greater evaluative weight on, related work experience.
6. New courses should be developed, or existing courses modified, to include content such as the change process and facilitating change in an institution, developing teams and working collaboratively, using cooperative learning techniques, and developing instruction to address differences in learning styles.
7. Vocational/technical and academic subject area teacher educators should cooperatively develop interdisciplinary courses which demonstrate the connections and applications of the content and skills.

Long Term Vision: A Process of Continual Development

The precepts of Tech Prep represent the basis for a new way of viewing teaching and, therefore, the preparation of teachers. While it is important to initiate change within the existing sphere of influence, it is even more important to envision and plan for more far-reaching and inclusive reform.

The notion of pre- and in-service education which suggests a beginning and ending to phases of development of an educator is outdated and should be replaced with a process of continual development of all educational professionals (i.e., teachers, counselors, and administrators) at all levels of the educational enterprise. This continual training and development then needs to be linked to a meaningful career ladder for educational professions (at both the secondary and postsecondary levels).

Subject matter competence must be maintained throughout a career. This must be achieved through an approach that integrates theory and practice, but not just in the world of teaching, but also in the world of work. For example, for educational professionals to apply their subject matter to solve problems, specifically work-related problems taught in Tech Prep, then developmental experiences must ensure that educational professionals participate in problem solving in both work place and teaching, counseling, and/or administrative environments. Educators must practice transferring knowledge between work place and teaching environments; then, they must be rewarded for successfully developing and delivering instruction, counseling services, and educational programs that enable students to do so as well. In our highly technological world, this process must be on-going throughout an individual's career requiring formal partnerships between employers and educational organizations for teachers as well as their students.

The goal of any "continual" development process should be to facilitate mastery. For example, entry-level teachers must have a command of teaching methods, delivery strategies, educational technologies, student assessment, and so on. As individuals progress throughout a career, their expertise needs to broaden and deepen, enabling them to become "master teachers". The same concept applies to counselors and administrators. Clearly, this process can best be facilitated if systematically considered over the span of a career rather than through a limited pre-service program.

The capacity to identify and meet the needs of an increasingly diverse student population is critical. It is central to developing and implementing Tech Prep where addressing the needs of students with a wide range of academic abilities, educational aspirations, motivational levels, and ethnic and cultural backgrounds is essential.

The development of educational innovators as leaders, empowering "front-line" educators to make decisions about educational purposes and processes for its citizens is the ultimate goal of any "continual" development model. It involves creating the capacity in individuals to work together (in teams) to conceptualize, design, develop, implement, evaluate, and improve educational initiatives--to manage change. This can begin with Tech Prep, however it should be viewed as only one innovation in a continuum of innovations that can improve education.

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